

15 April 2014

The Honorable Fred Upton
Chairman
House Energy & Commerce Committee
2183 Rayburn House Office Building
Washington, DC 20515

The Honorable Henry Waxman
Ranking Member
House Energy & Commerce Committee
2204 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Upton and Ranking Member Waxman:

On behalf of the 205,000 members of IEEE in the United States, IEEE-USA is pleased to respond to your April 1, 2014 request for comments on US spectrum policy.

We are attaching two public documents on key issues of spectrum policy. These documents are intended to be both nonpartisan and industry neutral with respect to spectrum access. The basic problems of spectrum policy discussed here have developed over a long time under administrations of both parties.

The first document, **“Position Statement on Improving U.S. Spectrum Policy Deliberations in the Period 2013-2017”** (also available at <https://www.ieeeusa.org/policy/positions/SpectrumPoiley1112.pdf>) gives 10 specific suggestions in the following three categories:

- Process Improvement
- Improved technical resources for FCC and NTIA to improve decision making
- Other Issues to Stimulate Innovation

Many of these recommendations could be done within existing legislation. Some require additional funding. While we recognize that increased funding is hard to find at the moment, the present funding levels of the spectrum activities at NTIA and FCC are negligible compared to the economic activity encouraged by these programs. Increased funding of a few additional million dollars per year would be vastly offset by the increased economic activities and innovation these investments would encourage. We also note that the spectrum management activities of NTIA and FCC are both mainly financed through user fees - not general tax revenue.

The second document, **“Clarifying Harmful Interference Will Facilitate Wireless Innovation”** (also available at <http://www.ieeeusa.org/policy/whitepapers/IEEEUSAWP-HarmfulInterference0712.pdf>) explains how the concept of 'harmful interference', key to many spectrum policy decisions, is poorly defined considering modern technology. While a redefinition would be impractical for many reasons, FCC and NTIA could significantly improve both the transparency and speed of many spectrum policy decisions simply by clarifying some or all of these 6 issues discussed in the white paper:

- I/S Protection at Receiver
- I/S Power Flux Density at the Antenna or I/S Power at the Receiver
- Propagation Models
- MCL Vice Stochastic Modeling
- Minimum Protection Distance
- Acceptable Interference Statistics

We believe that such clarifications would decrease the present regulatory uncertainties associated with wireless technology development and improve US competitiveness in emerging wireless technologies while assuring incumbent users about their actual spectrum rights.

IEEE-USA is an organizational unit of the Institute of Electrical and Electronics Engineers, Inc. (IEEE), the world's largest organization for technical professionals, and a leading educational and scientific association for the advancement of technology. IEEE-USA fosters technological innovation for the benefit of all, including more than 205,000 U.S. engineers, scientists, and allied professionals who are members of the IEEE. Members of our Communications Policy Committee include professionals working in industry, academia and government and bring with them decades of direct, first-hand experience working on spectrum-related issues.

We appreciate the Committee's willingness to tackle these important issues. Spectrum policy is vitally important to the health of our nation's economy and we commend you for addressing current shortcomings. We look forward to working with you on these issues in the future. Please contact Russ Harrison at either (202) 530-8326 or r.t.harrison@ieee.org if you have any questions or need more information.

Thank you.

Sincerely,



Gary L. Blank
2014 IEEE-USA President

Encls.

POSITION STATEMENT

Improving U.S. Spectrum Policy Deliberations in the Period 2013-2017

*(Approved by the IEEE-USA
Board of Directors, 13 November 2012)*

IEEE-USA recommends that the U.S. government improve its decision-making process for spectrum management in order to stimulate technical innovation, encourage the private capital formation key to technical innovation, improve U.S. competitiveness in the international telecommunications marketplace, and ensure reliable availability of spectrum for disaster response and national defense.

As the U.S. society and economy are becoming more mobile and more information centric, radio spectrum policy is becoming increasingly important to ensure maximum economic growth and to balance that growth with critical national security, public safety, and socially important uses. While key parts of spectrum management require an understanding of technical issues (e.g. How much will spectrum use X disrupt with spectrum use Y through various interference mechanisms?), other aspects require more subjective considerations dealing with the relative impact to society of competing uses.

Federal spectrum use is the responsibility of the President, and is delegated by statute to the Department of Commerce's National Telecommunications and Information Administration (NTIA). No formal mechanism exists to resolve domestic policy disagreements in this bifurcation of functions although historically such issues have been resolved adequately.

To improve the functioning of spectrum management and stimulate the economy IEEE-USA recommends several changes. Some of these changes can be implemented by the FCC and the Executive branch without legislation while others would require legislation. These recommendations are divided into three groups:

- 1) Process improvements
- 2) Improved technical resources for FCC and NTIA
- 3) Issues to stimulate innovation

This statement was developed by the IEEE-USA Committee on Communications Policy and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. IEEE-USA advances the public good and promotes the careers and public policy interests of more than 200,000 engineers, scientists, and allied professionals who are U.S. members of IEEE. The positions taken by IEEE-USA do not necessarily reflect the views of IEEE or its other organizational units.

BACKGROUND

The basic mechanisms for spectrum management in the U. S. government have changed little since the Communications Act of 1934 which in turn was based heavily on earlier legislation. The Federal Communications Commission (FCC), an independent agency with five commissioners appointed for staggered 5-year terms by the President and confirmed by the Senate, has responsibility for spectrum use by the private sector, as well as state and local governments. Federal spectrum use is the responsibility of the President and is delegated by statute to the Department of Commerce's National Telecommunications and Information Administration (NTIA). No formal mechanism exists to resolve domestic policy disagreements in this bifurcation of functions although historically they have been resolved adequately.

Some of these IEEE-USA recommendations require additional funding. It is clear that new federal expenditures will be closely examined in the next four years in view of the overall federal budget situation. However, it should also be noted that the cost of present or even expanded expenditures discussed below for regulation is minuscule in comparison with the telecommunications industry marketplace. The potential positive impact that improved regulation would have on the industry will likely dwarf such modest regulatory increases. Further, since the telecom industry is a basic infrastructure of the US economy, efficiency spurs economic growth in both telecom users and new entities that exploit new telecom features, e/g/ app developers. Finally, both FCC and NTIA spectrum regulation are mostly user fee supported, so these costs could be recovered through modest increases in such user fees.

Process Improvement:

FCC and NTIA should explicitly acknowledge the role of Section 7 of the Communications Act of 1934, as amended, and the intent of Congress to encourage new communications technology and services. These agencies should adopt transparent procedures for determining which innovations are subject to this statute and should make readily available information on such proceedings. The FCC and NTIA should recommend changes in the statute in a timely way, if the current terms of Section 7 are deemed not practical.

Section 7 of the Communications Act¹ was passed in 1982 to facilitate the approval and introduction of new technology in FCC-regulated industries. Since the passage of this legislation FCC has consistently ignored its provisions. FCC Commissioner Ajit Pai recently called Section 7 “the neglected stepchild of communications law.”² Since NTIA shares jurisdiction with FCC over bands that are shared with federal systems, or where use could impact federal systems, some of the provisions of Section 7 also apply to NTIA.

FCC and NTIA should develop explicit policy statements regarding how they will make determinations of whether Section 7 applies to a proposed new technology, and what procedures they will use to meet the statutory guideline. The present techniques of tracking corporate merger review³ at FCC might be a model for keeping the public informed about the status of Section 7 determinations.

If NTIA and FCC decide that the provisions of Section 7 need to be revised to make them more practical, they should include proposed changes in their annual legislative requests.

Petitions for rule changes and clarifications are key issues in the regulation of the dynamic telecommunications industry. FCC should act on such petitions in a more transparent way, and make available information on petitions and their status on a consistent timely schedule.

In spectrum regulation new innovations often require a rule change or interpretation for their commercial use. This practice has been a long-time problem for FCC, with respect to responsiveness.

The First Amendment guarantees the right “to petition the Government for a redress of grievances”, a right also stated more recently in the Administrative Procedures Act (APA).⁴ Yet, for decades FCC has had minimal transparency, with respect to petitions in both technical and nontechnical matters. Filed petitions can sit for years without any acknowledgement that they were filed, or without public access to their content at FCC. For example, a November 2007 petition⁵ filed by CTIA, a major trade association, did not receive any public attention at FCC until January 2010, when a Public Notice⁶ was issued addressing comment on some, but not all, of the issues in the petition. If a major trade association can not get transparency on a petition that it classified as “urgent,” the challenges facing a startup company needing an answer on a possible rule change, or clarification for a new product or service seem daunting.

FCC should use its website to announce the filing and status of petitions within a few months of their filing to meet the intent of the First Amendment and APA. The Commission should review its backlog of petitions on a regular basis, to resolve such issues more expeditiously.

Improved technical resources for FCC and NTIA to improve decision making:

In selecting presidential appointments to FCC, NTIA, and the State Department in communications policy functions consideration should be given to individuals with experience in the information and communications technology (ICT) industries, to balance the backgrounds of the officials in these key positions.

While the ICT industries have been major contributors to recent economic growth, the presidential appointees in the three major agencies that deal with national and international telecommunications issues have not included anyone with actual ICT industry experience in recent memory. Many types of experience are necessary in communications policy deliberations, but the consistent lack of individuals with ICT industry experience may have been detrimental to recent deliberations.

FCC commissioners should consider appointing individuals with experience in the information and communications technology (ICT) industries. as one of their three assistants, allowed by law

FCC commissioners have three "professional assistants" that they can appoint independent of civil service laws.⁷ The original legislation required one of these assistants to be an engineer. In practice today, all three assistants in FCC commissioners' offices are usually lawyers with no experience in ICT industries. While the FCC's jurisdiction is quite large, and includes issues from broadcast ownership and content to corporate mergers of telecom carriers, technical realities remain a key part of this jurisdiction from spectrum management to the technical evolution of "wired" networks. An individual with ICT industry experience would add new insight to the impact of current and proposed regulations on both ongoing businesses and new businesses, whose access to capital often depends on capital markets' perceptions of regulations.

While there have been various legislative proposals to require specific academic background for some of the commissioners' assistants, a more flexible approach would be to urge commissioners to consider at least one assistant with actual experience in the ICT industries.

FCC and NTIA should supplement their existing Technological Advisory Council (TAC) and Commerce Spectrum Management Advisory Committee (CSMAC), which consist mainly of representatives of major communications firms, with a new advisory committee that serves both agencies and focuses on independent review of options for resolving spectrum conflicts and identifying outdated policies. The new group should be modeled on the EPA Science Advisory Board and the NRC Advisory Committee on Reactor Safeguards and members should have the necessary security clearances to deal with issues involving classified federal government spectrum users, if so requested.

Both FCC's TAC and NTIA's CSMAC have been implemented with members who are in most cases representatives of affected parties. While this representation is beneficial in many cases -- in reviewing what affected parties want and how they might be impacted by possible decisions -- it does not give the agencies all the options that are possible with today's and future technologies. FCC has never even asked the TAC to recommend or evaluate options on pending docketed proceedings. On the NTIA side, the CSMAC charter has no provisions for classified deliberations showing that NTIA is not using it for reviewing pending government/federal spectrum policy matters.

FCC and NTIA should supplement the existing committees with a new advisory committee patterned after the prestigious committees that serve NRC and EPA consisting of distinguished members without immediate conflicts (e.g., academics and retirees who have agreed to limit their consulting activities, in exchange for payment as special government employees). A committee that advises both agencies will be a cost-effective way to make sure both are presented with technology policy options, and that their impacts have been evaluated in an objective fashion. The FCC commissioners and the NTIA administrator can then combine this input with more subjective factors in making national interest determinations and policy decisions.

FCC and NTIA should have the resources to contract with the National Academy of Science's National Research Council (NAS/NRC), Federally Funded Research and Development Centers (FFRDCs) and private analysis contractors, to supplement their internal staffs on novel technical policy questions where they lack the appropriate internal resources.

Other federal regulatory agencies with technical jurisdiction have resources that can be used to supplement their permanent staff capabilities, with studies on new technologies and their policy issues. Both FFRDCs and NAS/NRC are often used by other agencies, yet FCC and NTIA lack the funds to use these resources. As a result proceedings in innovative technologies often drag on for years. Also the two agencies lack the resources to review regularly existing technical policies to see if they have become anachronistic with today's technologies. While NTIA has the Institute for

Telecommunications Sciences (ITS) as an internal resource, most ITS activities are actually studies for other agencies, while FCC and NTIA have minimal resources to use this “internal FFRDC.”

An example of how outside resources have been used to resolve contentious technical policy issues and guide US policy on to a new path in the past is the 1970 NAS/NRC study that recommended a technical solution to the telephone interconnection issue.⁸ This NAS/NRC study set the basic framework for Part 68 of the Commission's Rules, which in turn, was the foundation for telephone interconnection rules in many other countries.

More recently the MITRE Corporation, an FFRDC, did a study⁹ in 2001 for FCC, ordered by special legislation,¹⁰ to recommend alternatives for resolving the contentious unprecedented technical issues in the 12 GHz terrestrial/direct broadcast satellite spectrum sharing proceeding (often referred to as “Northpoint”), ET Docket 98-206. These MITRE recommendations then formed the basis for the Multichannel Video Distribution and Data Service rules¹¹ that FCC adopted in 2002, some of the most technically complex rules FCC has ever adopted.

Thus, in both the Part 68 and MVDDS cases, outside independent resources were used to resolve technically complex, contentious issues in a timely way.

The NTIA and FCC technical staffs are key to the long-term success of U.S. spectrum policy. Recruiting and developing the careers of these personnel should be done using the best practices of other agencies involved in technical policy development.

The FCC legal and technical staffs are roughly comparable in size, and both are key resources in the agency's mission. However, FCC for many years has given low priority to recruiting and career development for entry level technical staff. Indeed, while legal staff recruiting starts at the beginning of the academic year, technical staff recruiting has often had to wait until all budget issues were resolved, typically near the end of the academic year when top students have already selected employers. FCC should follow best practices of other federal agencies that have significant technical staffs, with respect to both timing of recruiting and later career development activities.

All technical staff, not just new hires, should be encouraged to continue their education by making the resources and time available for them to do so. This education could include attending and participating in technical conferences, as well as more formal education at colleges and universities. In addition the staff should be encouraged to participate in outside professional organizations.

Other Issues to Stimulate Innovation:

The executive branch should act to review and implement the recommendations for federal spectrum management reform in Sections 5.2 – 5.6 of the July 2012 President's Council of Advisors on Science and Technology (PCAST) report, "Realizing the Full Potential of Government-Held Spectrum," to facilitate the reallocation and sharing of federal spectrum for private sector use.

The PCAST spectrum report¹² is controversial in some areas. But the findings and recommendations in Sections 5.2-5.6¹³ of the report have attracted no controversy. These sections deal with improving the implementation of spectrum management for federal users pursuant to Sections 305 and 902 of the Communications Act of 1934, as amended.¹⁴ As the report clearly states, the players in federal spectrum management lack both the incentives and resources to ensure that wireless spectrum is used for the maximum national benefits. Incumbent federal spectrum users lack the financial resources to explore alternatives to their present spectrum use that might make more spectrum available to other federal and nonfederal users. The report proposes an increased White House role in strategic spectrum policy, one that has been lacking for several decades. The recommendations for improved federal spectrum management in the PCAST report deserve serious consideration and implementation.

FCC and NTIA should review, and consider adopting the IEEE-USA recommendations for clarifying harmful interference.

Many spectrum policy decisions dealing with innovative wireless technology and service have as a key component--whether the new technology or service will cause "harmful interference" to existing users. FCC, NTIA, and the International Telecommunications Union (ITU) use the same definition of harmful interference:

Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these [Radio] Regulations.¹⁵

In practice, interpreting these 31 words in the context of modern technology has been very controversial, and is often quite time consuming. Recently IEEE-USA released a white paper¹⁶ "Clarifying Harmful Interference Will Facilitate Wireless Innovation," which addresses possible approaches for making harmful interference determinations more transparent. The white paper suggests breaking the issue into six sub-problems, and clarifying acceptable approaches for dealing with these sub problems.

The white paper also stresses the importance of both FCC and NTIA using comparable general approaches in making harmful interference determinations to improve transparency.

It is hoped that improved transparency, and more timely determinations in this area, will encourage capital formation in wireless R&D and bring technical innovation more rapidly to the US economy.

FCC should complete action in a timely way on Docket 09-157, which deals with wireless technical innovation.

In August 2009 FCC initiated a Notice of Inquiry dealing with "Fostering Innovation and Investment in the Wireless Communications Market", Docket 09-157.¹⁷ This proceeding was intended to identify issues that affect wireless innovation and to consider changes to FCC policies that might facilitate such innovation. It recognized "Policies that foster continued innovation have helped to encourage capital investment in wireless, and to deliver new and empowering technologies and applications to American consumers."

Unfortunately, FCC has not acted on this proceeding, and this inaction may be sending signals to capital markets that are the exact opposite of the original intent of the proceeding. This issue is key in spectrum policy, and FCC should finish its deliberations, and develop an action plan to encourage innovation to stimulate economic growth. The action plan should address the industries that develop and operate wireless technologies, the industries that build on new developments (e.g., "app" developers), and the non-communications industries whose productivity is improved through the use of innovative technologies.

ENDNOTES

¹ 47 USC 157:

a) It shall be the policy of the United States to encourage the provision of new technologies and services to the public. Any person or party (other than the Commission) who opposes a new technology or service proposed to be permitted under this chapter shall have the burden to demonstrate that such proposal is inconsistent with the public interest.

(b) The Commission shall determine whether any new technology or service proposed in a petition or application is in the public interest within one year after such petition or application is filed. If the Commission initiates its own proceeding for a new technology or service, such proceeding shall be completed within 12 months after it is initiated.

² http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-315268A1.pdf

³ <http://www.fcc.gov/encyclopedia/transaction-team-office-general-counsel>

⁴ 5 USC 553(e)

⁵ This petition was not made available at the FCC website until 2010, but was available on the CTIA site: http://files.ctia.org/pdf/filings/FINAL--CTIA--Jammers_Petition_for_Declaratory_Ruling.pdf

⁶ http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-10-14A1.pdf

⁷ 47 USC 154(f)(2)

⁸ National Research Council, "A Technical Analysis of the Common Carrier/User Interconnections Area", June 1970, http://www.nap.edu/catalog.php?record_id=13320

⁹ MITRE Corporation, Analysis of Potential MVDDS Interference to DBS in the 12.2–12.7 GHz Band, April 2001, http://transition.fcc.gov/oet/info/mitrereport/mitrereport_4_01.pdf

¹⁰ The FCC's Fiscal Year (FY) 2001 budget authorization contained a requirement that the FCC select an independent engineering firm to perform an analysis to determine whether these two services can share the band without any interference to DBS systems.

¹¹ 47 CFR 101.1401, 1440

¹² http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf

¹³ The findings and recommendations involved are given on p. 49-50 of the report:

Finding 5.1: There is no incentive system today for federal government agencies to be efficient in their use of spectrum or to share spectrum allocated to them with the non-Federal sector.

Finding 5.2: A public private partnership (PPP) is the best mechanism to ensure that optimal use is made of the federally-held spectrum and of related investments in spectrum research and testing.

Finding 5.3: International harmonization of spectrum policies is essential to product innovation, interoperability and roaming, spectrum efficiency, and cross-border frequency coordination.

Recommendation 5.1: PCAST recommends that the White House Chief Technology Officer (CTO) with senior officials at an equivalent level from the National Security Staff (NSS), the Office of Management and Budget (OMB), and the National Economic Council (NEC) formalize a Spectrum Management Team (SMT) to work with the National Telecommunications and Information Administration (NTIA), the Federal Communications Commission (FCC), and the major federal agencies that use spectrum to carry out the President's directive.

Recommendation 5.2: PCAST recommends that the NTIA, working with the SMT and Federal agencies, reexamine the partitioning of federal spectrum usage in light of current and emerging technology. One objective of this reexamination is to aggregate current spectrum partitions to create substantial frequency blocks in order to facilitate sharing through common technical use rules.

Recommendation 5.3: PCAST recommends that the President indicate that all federal agencies should cooperate with the SMT and NTIA to establish and implement a government-wide process and mechanism to share federally-held spectrum. Within one year, the SMT working with the NTIA should formulate concrete 5-year and 10-year goals for federal spectrum sharing opportunities in order to recommend to the President how to appropriately update his 2010 goal of making 500 MHz of federal and non-federal spectrum available over the next 10 years.

Recommendation 5.4: PCAST recommends that OMB, working with the SMT and NTIA, take steps to implement a mechanism that will give federal agencies incentives to share spectrum. Such a mechanism would accurately internalize the opportunity cost of federal spectrum resources and manage them over long time horizons using a "currency-like" accounting, allocation, and incentive system ("Spectrum Currency").

Recommendation 5.5: PCAST recommends that OMB should implement a sustainable funding mechanism to foster a federal spectrum sharing system. The existing Spectrum Relocation Fund should be redefined as a revolving "Spectrum Efficiency Fund" that recycles private sector payments for use of federal spectrum into reimbursements to federal agencies for investments that facilitate spectrum sharing and enhance spectrum efficiency. Congress should allow the Fund to reimburse qualifying costs by any Federal service, not just those in revenue-generating bands.

Recommendation 5.6: PCAST recommends that the President appoint an advisory committee of industry executives (e.g. CEOs), to be known as the Spectrum Sharing Partnership Steering Committee (SSP), to advise the SMT on a policy framework to maximize commercial success, centered on a public private partnership for sharing federally-held spectrum, and implementation milestones that lay the groundwork for the first spectrum superhighways.

Recommendation 5.7: The United States, represented by the Department of State with advice from NTIA and the FCC, should make international harmonization of spectrum allocations to wireless broadband, particularly in bands used or planned to be used for mobile broadband applications in the United States, a key element of the U.S. position at the 2015 World Radiocommunication Conference (WRC-15) and in bilateral and regional discussions with its own neighbors, Mexico and Canada.

¹⁴ 47 USC 305 gives the President, not FCC, responsibility for spectrum management of federal agencies. 47 USC 902 delegates this authority to the Department of Commerce's National Telecommunications and Information Administration. This basic bifurcation predates the creation of FCC in 1934.

¹⁵ 47 C.F.R. 2.1

¹⁶ <http://www.ieeeusa.org/policy/policy/2012/073112.pdf>

¹⁷ http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-66A1.pdf

CLARIFYING HARMFUL INTERFERENCE WILL FACILITATE WIRELESS INNOVATION

A WHITE PAPER

BY

IEEE-USA'S COMMITTEE ON COMMUNICATIONS POLICY



This White Paper was prepared by the Committee on Communications Policy of **The Institute of Electrical and Electronics Engineers-United States of America (IEEE-USA)**, with special assistance from CCP members *Michael Marcus, Bill Hayes, Charles Einolf, Ferdo Ivanek, David Kunkee, Dan Lubar, Wayne Luplow, and Luke Maki*. It represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. A roster of committee members is provided at the end of this document. White Papers are designed to provide balanced information on public policy issues in technology-related areas that may affect the interests of technical professionals. This document does not constitute a formal position statement of the IEEE-USA, and its contents do not necessarily reflect the views of IEEE-USA, IEEE or other IEEE organizational units. IEEE-USA has issued this whitepaper to enhance knowledge and promote discussion of the issues addressed. IEEE-USA advances the public good and promotes the careers and public policy interests of more than 200,000 engineers, scientists and allied professionals who are U.S. members of IEEE. IEEE-USA is part of IEEE, the world's largest technical professional society with 375,000 members in 160 countries.

TABLE OF CONTENTS

| | |
|--|----|
| EXECUTIVE SUMMARY..... | 4 |
| INTRODUCTION..... | 4 |
| WIRELESS TECHNICAL INNOVATION AND REGULATION..... | 6 |
| Transparency..... | 6 |
| Harmful Interference..... | 7 |
| Disadvantaged Innovators..... | 9 |
| GOVERNANCE AND HARMFUL INTERFERENCE..... | 10 |
| KEY TECHNICAL ISSUES IN HARMFUL INTERFERENCE..... | 11 |
| I/S Protection at Receiver..... | 12 |
| I/S Power Flux Density at the Antenna or I/S Power at the Receiver | 13 |
| Propagation Models..... | 13 |
| MCL Vice Stochastic Modeling | 14 |
| Minimum Protection Distance..... | 15 |
| Acceptable Interference Statistics..... | 15 |
| POSSIBLE PROCEDURAL APPROACHES FOR CLARIFYING HARMFUL INTERFERENCE | 16 |
| CONCLUSIONS..... | 17 |
| 2012 IEEE-USA CCP MEMBERSHIP ROSTER..... | 18 |

EXECUTIVE SUMMARY

In recent years, many of the spectrum policy controversies in the United States have dealt with the basic issue of whether a proposed technology or service will cause “harmful interference” to existing spectrum users. Resolving these issues has typically taken several years in an era where technology is moving at “Internet speed.” As the Federal Communications Commission (FCC) discussed in its Wireless Innovation Inquiry, the delays and lack of transparency associated with making go/no go determinations on harmful interference may be discouraging private investment in the development of innovative wireless technology.

This White Paper reviews the background of what is harmful interference and suggests incremental ways in which the two spectrum management agencies in the United States, the FCC and the National Telecommunications and Information Administration (NTIA), could clarify the definition by giving guidance on the sub-problems associated with harmful interference determinations. Changing the definition is probably impractical, due to the long list of precedents over decades that have been built on the current definition, even though it is not established by statute.

The White Paper also suggests that establishing timeliness goals similar to those voluntarily created by the FCC for equally complex and voluminous merger and acquisition reviews could also address the disincentives for private capital formation in the wireless technology area. Such timeliness goals could create a more “level playing field,” with respect to other technical areas concerning private funding of technical development.

INTRODUCTION

The IEEE has a deep understanding of the reasons why some regulation is required in selected technologies that our membership invents and manufactures for the world-at-large. One of these reasons is the important technology of wireless communications.

Both international regulation and U.S. domestic regulation often talk about the concept of “harmful interference” in the context of wireless, as it often plays a key role in determining whether and under what terms a new technology or service is permitted. While introducing new wireless technology is important, the rights of incumbent wireless (or “spectrum”) users are important as well.

Both regulatory certainty for incumbent users of wireless and flexibility to accommodate new innovative products and services for the public good are very important goals. But for various reasons, innovation in wireless technology often can put these two goals in conflict.

This fundamental conflict between interests of incumbents and innovators explains the difficulty regulators often have in devising a regime in a way that pleases all parties involved to address the overall public interest. However, the national importance of balancing these goals in our information age society and economy is a vital one. In fact, no matter how difficult the solution, one must be found—if for no other reason than supporting a nation’s economic competitive advantage.

The tool usually used in the U.S. spectrum regulation system in pursuing the important goal of balancing incumbent uses and innovation is the definition of *harmful interference*—a concept regulators have used as a means to measure harms to a spectrum user, and the service it provides.

While it is likely an unachievable goal to precisely “define” harmful interference, progress in clarifying what constitutes harmful interference will be helpful for both spectrum incumbents and wireless innovators by reducing present regulatory uncertainties. The harmful interference test for new services is embedded in decades of FCC decisions. The term is mentioned eight times in the *Communications*

Act', and with four more new references added in the recently enacted amendments to the Act in P.L. 112-96, yet it is never defined in legislation.

In classic wireless regulation, such as was in place in the United States prior to the mid-1970s, almost all innovative technologies needed positive regulatory action before they could be used in operational systems. Evolutionary changes to existing international spectrum regulation began in the aftermath of the 1912 *Titanic* disaster, and the formal regulation of radio in the United States began in the 1920s. The basic prescriptive regulation of wireless technology was introduced when relatively little spectrum was available for commercial operations, due to lack of technology, and therefore a poor ability to use it.

At the time the new FCC started down the path of detailed prescriptive regulation in 1935 during the New Deal, there was greater public support for the role of government regulation than is common today. It was also simple for the FCC to propose and adopt rules under its original legislation and the simple system of administrative law that existed at that time. Furthermore, the FCC could adopt "guidance," like its former *Standards of Good Engineering Practice*,² that had the impact of regulations—without even formal approval by the Commission.

The end of World War II changed the foundations of this system in both the technical and legal sense. The military technology advances during the war opened up higher and higher frequency bands and set in motion a movement that now has FCC rule provisions as high as 94 GHz and commercial production systems as high as 85 GHz. The following explosion in wireless technology resulted in a myriad of technology choices in modulation, channel access technology—other innovations that are a foundation of much that happens in wireless technology today. The expectation of ubiquitous wireless services as a part of everyday life became common, greatly increasing the demand for information to be delivered over wireless channels.

Finally, the "information age" resulted in a much faster rate of change of both technology and consumer demand for services, moving at "Internet speed."

At the same time demand and technology were accelerating, the aftermath of the New Deal and the partisan changes in Washington resulted in the 1946 *Administrative Procedure Act/APA*,³ that brought formal checks and balances to administrative regulation in the federal government by requiring notice and comment in rule makings, and formalizing the process of court review of agency actions. Court decisions of the next two decades clarified what *notice and comment* and *arbitrary and capricious*⁴ meant in practice. The net result of the APA, and its growing case law, was that the ability of the FCC in the 1930s to readily update its wireless rules slowed significantly—just as the need to update them increased tremendously, due to movement to ever higher frequencies, expanding technological options, and expanding consumer demand for wireless services.

Currently, the general trend in wireless technical regulation in the United States has been for deregulation. This White Paper does not deal with changing this trend, rather it suggests that wireless regulations related to new types of wireless technologies and systems should be more transparent and clear, and should resolve in a more timely way policy determinations that may block innovation—or conversely enable new technologies to come to market in a more timely way.

1 47 USC 302(a), 303(y)(2), 337, 354, 922, 923, 1100, 2511

2 FCC, *Standards of Good Engineering practice Concerning Broadcast Stations*, 1939 (http://www.hatdaw.com/papers/Standards_of_good_engineering.PDF); *FCC v. WJR, The Goodwill Station, Inc.*, 337 U.S. 265 (1949)

3 5 U.S.C. 553

4 5 U.S.C. 702

WIRELESS TECHNICAL INNOVATION AND REGULATION

The early 20th century model of detailed regulation of wireless technology, and a prescriptive approach towards new technology, became increasingly inappropriate in the second half of the century. While the certainty resulting from permitting only enumerated technologies; slow adoption of new ones helped established industry players make long-term research, development and manufacturing plans. It was also a serious disincentive for new entrants to the field since new technology could only be implemented after a multi-year regulatory battle, in which established players and their allies would subject the new technology to detailed public review and criticism.

In the period preceding spectrum auctions and the accompanying spectrum technical deregulation in the 1990s, at times it appeared that the major wireless incumbents, both licensees and equipment manufacturers, used their "inside track position" at the FCC to delay innovative technologies that they did not control. This way, they could both minimize the threat of potential new competitors, as well as ensure that they could fully amortize the cost of new product development and new equipment, before they became obsolete.

Indeed, the perception of excessive regulatory delay at the FCC was the very reason for the adoption of 47 USC 157(b)⁵ in 1983, which attempted to set a one-year time limit on deliberations of new technologies and services for the FCC. Unfortunately, the language of §157(b) was not clear enough to have any real impact, and the hard, one-year limit was probably unrealistic. In any case, §157 has had nearly no real impact in the nearly 30 years since it was first passed. §157 might even have been worse than a total failure, in that it may have given unreasonable expectations to innovators and entrepreneurs during this period to launch hopeless attempts to get questions of new technology resolved in a timely way. Such repeated failures may well have made capital for innovative technologies harder to obtain rather than easier.

The FCC movement toward technical deregulation of wireless technology and "technical flexibility" begun in the late 1970s was an attempt to get out of the need for case-by-case adjudication of new wireless technologies. However, at its core was the need to make some general findings about the interference potential of new technologies, as the previous new technology rulemakings were really *ad hoc* determinations of this issue. A general threshold for interference potential is desirable to achieve complete transparency for new technology, as well as protect incumbents. In reality, this goal is a near impossibility, particularly in the present policy deliberation structure.

TRANSPARENCY

Transparency in regulation deals with both the formulation of regulations and their implementation. Regulations should be adopted in an open manner, in which affected parties can comment on them and these comments are addressed in the final decision-making. Regulation transparency is the heart of the *U.S. Administrative Procedures Act*. Further, the regulations should be clear enough that affected parties understand what they mean, and see the factors that affect how they will be interpreted in new circumstances. The World Bank has written that "(t)o reassure stakeholders, regulatory decisions must be made according to established rules methodologies, and processes. That calls for setting out in

5 "The Commission shall determine whether any new technology or service proposed in a petition or application is in the public interest, within one year after such petition or application is filed. If the Commission initiates its own proceeding for a new technology or service, such proceeding shall be completed within 12 months after it is initiated."

openly available regulatory documents, in as much detail as possible, the factors feeding into the regulator's decision.”⁶

The FCC's *Best Practices for National Spectrum Management*⁷ includes the following points:

- Promoting **transparent**, fair, economically efficient, and effective spectrum management policies, i.e., regulating the efficient and adequate use of the spectrum, taking into due account the need to avoid harmful interference, and the possibility of imposing technical restrictions to safeguard the public interest (emphasis added)
- Making public, wherever practicable, national frequency allocation plans and frequency assignment data to encourage openness; and to facilitate development of new radio systems, i.e., carrying out public consultations on proposed changes to national frequency allocation plans, and on spectrum management decisions likely to affect service providers, to allow interested parties to participate in the decision-making process
- Maintaining a stable decision-making process that permits consideration of the public interest in managing the radio frequency spectrum; i.e., providing legal certainty by having fair and transparent processes for granting licenses for the use of spectrum, using competitive mechanisms, when necessary
- Adopting decisions that are technologically neutral and allow for evolution to new radio applications
- Facilitating timely introduction of appropriate new applications and technology, while protecting existing services from harmful interference including, when appropriate, the provision of a mechanism to allow compensation for systems that must redeploy for new spectrum needs
- Considering effective policies to mitigate harm to users of existing services when reallocating spectrum

Transparency is a key part of U.S. spectrum management, as well as a U.S. recommendation for other countries.

HARMFUL INTERFERENCE

The FCC has a longstanding tradition to allow new wireless technologies, if they do not cause harmful interference to other spectrum users. In the U.S. common law system, the decades of use of harm interference as a protection criterion has created legal precedents that are not easily replaced by another criteria. As was mentioned previously, “harmful interference” is *referenced* multiple times in legislation—but it is not *defined* there. The only explicit definition is the same one used in the ITU Radio Regulations, incorporated verbatim into the FCC Rules⁸ and the NTIA Red Book. This definition states that harmful interference is “(i)nterference which endangers the functioning of a radionavigation service

⁶ World Bank, Public-Private Infrastructure Advisory Facility, *How to improve regulatory transparency*, June 2006 (<http://www.ppiaf.org/ppiaf/sites/ppiaf.org/files/publication/Gridlines-11-How%20to%20Improve%20Regulatory%20Transparency%20-%20LBertolini.pdf>)

⁷ <http://transition.fcc.gov/ib/sand/irb/bestpractices.html>

⁸ 47 C.F.R. 2.1

or of other safety services, or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with [the ITU] Radio Regulations."

This definition implicitly contains two subcases. First, for the case of "a radionavigation service⁹ or of other safety services," harmful interference is something that "endangers the functioning" of the service. For the cases of other radio services, harmful interference is something that "seriously degrades, obstructs, or repeatedly interrupts" the service.

While International Telecommunication Union (ITU) has used the related concept of "tolerable interference" in interservice spectrum sharing deliberations, the criteria consistently used in both U.S. legislation, and decades of FCC precedents, is "harmful interference," which continues to be poorly defined and adjudicated, in a time-consuming process that has major transparency problems.

As part of President G. W. Bush's *Spectrum Policy Initiative*, begun in May 2003 to "promote the development and implementation of a United States spectrum policy for the 21st century," NTIA attempted to identify "interference protection criteria"/IPC for wireless systems." This study was intended to be a two-part, with the first part surveying national and international precedents in harmful interference. In the second part, NTIA intended to "review the relevant federal government policies and practices regarding IPC; and recommend regulatory and technical refinements that may improve IPC application's scope, utility, clarity, or effectiveness."¹⁰ In the almost seven years since the first section of the report surveying harmful interference precedents, NTIA has not issued the planned second part on "regulatory and policy refinements."

Any FCC or NTIA statement attempting to clarify harmful interference is made difficult by the fact that many key players, whose participation is needed in the usual consensus development, may see no advantage to moving away from the *status quo*.

The problem of ambiguity and lengthy regulatory determinations of what is harmful interference directly impacts innovators more than it affects incumbents who might see such delays as advantageous. However, uncertainties might also impact long-term capital formation for incumbents, should investors performing due diligence observe transparency problems, with respect to protecting their investment, or understanding the total risk involved.

In the FCC's *Wireless Innovation NOI*, the Commission recognized the importance of clarifying harmful interference by saying:

"Spectrum allocations and access often hinge on controlling interference between new services and incumbent services, as do licensing and service rules, to some extent. The resolution of disputes about potential or actual interference in rulemakings can pose a major impediment to the introduction of new services, devices and technologies, either as a result of long delays in the establishment of service rules, or the imposition of onerous and perhaps unachievable technical standards.

What are the best ways to balance the interference protection rights of incumbents against the opportunities for access to spectrum, and how do interference protection considerations affect innovation? Radio services are generally afforded protection from "harmful interference" on either a primary or secondary basis depending upon their status in the Table of Frequency Allocations. The trend of more radio services and devices seeking to use extremely weak signals and mobility

9 Radionavigation is, in turn, defined as "Radio determination used for the purposes of navigation, including obstruction warning." "Safety service" is defined as "(a)ny radiocommunication service used permanently or temporarily for the safeguarding of human life and property." - 47 C.F.R. 2.1

10 NTIA, *INTERFERENCE PROTECTION CRITERIA Phase 1 - Compilation from Existing Sources*, NTIA Report 05-432, October 2005, (http://www.ntia.doc.gov/osmhome/reports/ntia05-432/IPC_Phase_1_Report.pdf)

*bringing products in closer proximity to each other is making the risk of interference a more acute problem. A challenge for the Commission is that application of these criteria often devolves to a case-by-case interpretation of conflicting data. What criteria should be specified and how would they be quantified? ...The viability of spectrum access for new radio services often centers on whether the new service may cause harmful interference to incumbent services. This can lead to delays through protracted rule making proceedings that can create uncertainty and discourage investment.*¹¹ (Footnotes omitted)

In the regulatory *status quo*, the FCC makes determinations of harmful interference from a potential new system based on the cryptic definition in its Rules, and on vague past precedents. In cases involving possible interference to federal government systems, NTIA provides input to the FCC, that under existing *ex parte*, rules need only be made public just prior to any FCC decision.¹² In general, there isn't even agreement, in many cases, on which past precedents are applicable.

This lack of definition sets up a legal confrontation between the incumbents and the proponent of the new technology. Since the deadlines of Section 7 of the *Communications Act* are essentially ignored, as discussed above, this confrontation can go on indefinitely.

DISADVANTAGED INNOVATORS

Assuming the incumbents have ongoing businesses using the spectrum, and the proponent is funded by venture capital or comparable funding, the regulatory battle could divert a small fraction of the incumbents income and profits, while denying the proponent *any income*, and pushing any potential profits further into the future. And it widens and deepens the cash flow "valley of death"¹³ that any entrepreneur faces in developing a new product or service. Sooner or later, it may be just a question of when the proponent will "bleed out" all of its capital, and drop by the wayside. In the case of ultrawideband technology, the three proponents managed to survive the rulemaking process, but the two most active succumbed to bankruptcy within a year. In the recent case of the AWS-3 band, the proponent urged the FCC to give a clear signal five years into its deliberations, and with a telephone call,¹⁴ their proposal was dismissed without ever resolving either the technical or nontechnical issues in their proposal.¹⁵

In contrast to this endless process for harmful interference deliberations, the FCC has adopted an "informal guideline" for its consideration of corporate mergers, even though no statutory time is required for such deliberations.¹⁶ The Commission's website gives a nominal schedule and makes the following statement about this timeline:

The timeline represents the Commission's goal of completing action on assignment and transfer of control applications (i.e., granting, designating for hearing, or denying) within 180 days of public notice. Routine applications should be decided well within the 180-day mark. More complex applications may take longer. It is the Commission's policy to decide all applications, regardless

¹¹ FCC, *Notice of Inquiry*, Docket 09-157, August 27, 2009 at para. 34-35

¹² 47 C.F.R. 1.1204(a)(5)

¹³ "Into the Valley of Death," http://andrewhargadon.typepad.com/my_weblog/2010/04/into-the-valley-of-death.html

¹⁴ "What's Next for M22?" *Wireless World Blog*, 9/2/10 (<http://www.wirelessweek.com/Blogs/Wireless-Week-Blog/What-s-Next-for-M22-/>)

¹⁵ The nontechnical issues involved a "freemium" plan under which M22 would receive a license at no auction cost, but with a condition to supply service at a basic rate to anyone seeking it, and then charge for high rates and any special content. The technical issues focused on whether time division duplex (TDD) use of the AWS-3 band was possible, without harmful interference to the lower adjacent AWS-2 band, generally licensed to T-Mobile.

¹⁶ See <http://www.fcc.gov/transaction/timeline.html>

of whether they are highlighted on the web page, as expeditiously as possible consistent with the Commission's regulatory responsibilities. Although the Commission will endeavor to meet its 180-day goal in all cases, several factors could cause the Commission's review of a particular application to exceed 180 days. Delay in action beyond the 180-day goal in a particular case is not indicative of how the Commission ultimately will resolve an application.

Furthermore, the website even has a "shot clock" for such applications.¹⁷ In practice, the FCC generally acts on corporate mergers within 12 months of the formal application, consistent with its goal— nominally 180 days—but allows "stopping" the clock. Corporate mergers, like harmful interference determinations, are complex regulatory problems involving balancing of many issues, and often involve thousands of public comments that must be reviewed before making a decision under the APA. But the FCC has determined to resolve harmful interference issues, including issues relating to technical innovation, in a timely way, to help and benefit the economy, as part of its , core Title III Mission.

A sharp contrast exists, then, between actions in complex corporate merger deliberations that lack statutory requirement for any specific schedule for approval, and technical new spectrum technology deliberations involving harmful interference issues that are nominally subject, in many cases, to the Section 7 quantitative time limit that is routinely ignored.

While the corporate entities involved in multibillion dollar mergers certainly incur extra costs while the mergers are pending, entrepreneurial firms seeking approval of innovative wireless technologies in harmful interference determinations are even in more of a life or death battle of beating the clock— before they literally expire.

GOVERNANCE AND HARMFUL INTERFERENCE

Under present procedures, the FCC is the final arbiter of harmful interference to nongovernment systems and NTIA for federal government systems. The recent LightSquared/GPS proceeding shows the complexity of situations where FCC-regulated entities are alleged to be an interference risk to NTIA-regulated systems. In practice, the FCC uses notice and comment rulemakings, sometimes supplemented by testing in its own laboratory. In practice NTIA relies almost exclusively on the deliberations of its Interdepartmental Radio Advisory Committee (IRAC),¹⁸ composed of representatives of the major agencies with wireless systems. IRAC operates in a much less transparent fashion than the FCC, in part due to the nature of its intragovernmental role.

In the ongoing GPS/LightSquared deliberations, NTIA has given due deference¹⁹ to the Executive Steering Committee of the Interagency National Executive Committee for Space-Based Positioning, Navigation and Timing (EXCOM), a group which, unlike FCC and NTIA, has no statutory charter in spectrum management. The FCC has not sought input from its Technological Advisory Council²⁰ and NTIA has not sought input from its Commerce Spectrum Management Advisory Committee²¹ in this matter or in any

17 For example, <http://www.fcc.gov/transaction/comcast-nbcu.html> gives the shot clock for the Comcast/NBC Universal merger

18 <http://www.ntia.doc.gov/osmhome/iracdefn.html>

19 Letter from NTIA Administrator Strickling to FCC Chairman Genachowski, February 14, 2012 (http://www.ntia.doc.gov/files/ntia/publications/lightquared_letter_to_chairman_genachowski_-_feb_14_2012.pdf)

20 <http://www.fcc.gov/encyclopedia/technological-advisory-council>

21 <http://www.ntia.doc.gov/category/csmac>

other harmful interference matter. By contrast, a detailed study by The Brookings Institution shows how other regulatory agencies use technical advisory committees as part of their deliberations.²²

Neither FCC, nor NTIA, has sought advice from the National Research Council of the National Academies²³ on a harmful interference issue since the 1970s, although other regulatory agencies with technical jurisdiction²⁴ seek advice from the National Research Council for complex technical issues in their jurisdiction.

Sometimes harmful interference determinations involve straight forward applications of well-known concepts, while at other times there are novel interference issues. Examples of the later were the Northpoint/MVDDS, ultra-wideband, and AWS-3 controversies. In the Northpoint/MVDDS case, Congress ordered the FCC to get an outside party to evaluate the novel technical issues involved²⁵ and make a timely recommendation. When selection mechanism in the legislation for the outside party was unworkable, all affected entities agreed that MITRE Corporation was an acceptable contractor.

The resulting MITRE report²⁶ contained key recommendations for the technical controversy that, in Turn, were generally adopted in the FCC rules²⁷. While the FCC had also used a study by the National Academy of Science/National Research Council to set the basis of C band (4/6 GHz) sharing between terrestrial fixed users and satellite users in the 1970s, the use of similar outside studies in FCC spectrum formulation has been exceedingly rare, even though such studies are much more commonly used by other regulatory agencies with technical jurisdiction.

While the transparent notice and comment process provided for in the APA for many public policy determinations has many advantages, its near exclusive use, without any outside independent studies in harmful interference/radio rights issues may be inappropriate, and may result in practice from the lack of funding at the FCC for any alternative. While NTIA has its own well respected laboratory, the Institute for Telecommunications Sciences(ITS), ITS mainly functions as a research contractor for other government agencies, and the NTIA has little funding to support studies at ITS, in support of NTIA's own mission. While the FCC *could* contract with ITS for studies in support of policy deliberations, in practice it does not do so, and probably lacks adequate funding to do so.

KEY TECHNICAL ISSUES IN HARMFUL INTERFERENCE

In this section, we will divide the issue of harmful interference into subproblems that would have to be specified to more fully define the rights of an incumbent, and to determine what is allowed for a new entrant. While some of the subproblems are well understood in some contexts, e.g., broadcast

22 Bruce L. R. Smith, *The Advisers: Scientists in the Policy Process*, The Brookings Institution, 1992

23 <http://www.nationalacademies.org/nrc/policies.html>

24 <http://www8.nationalacademies.org/cp/ReportView.aspx?key=Subject>

25 Novel key issues in this controversy included the exact sensitivity of DBS home antennas in operational use in directions other than the intended direction of the satellite system; the impact of heavy rain falls on both the DBS signal path to the receiver; and the MVDDS interference path to the DBS receiver, as well as when or whether infrequent interference became "harmful."

26 MITRE Corp., "Analysis of Potential MVDDS Interference to DBS in the 12.2–12.7 GHz Band," MTR 01W0000024, April 2001 (http://www.fcc.gov/oet/info/mitrereport/mitrereport_4_01.pdf)

27 47 C. F. R. §§101.1401,1440

televisions to broadcast television interference, technical innovation inevitably results in circumstances no clear precedents or guidance exists for the relevant sub-problems.

The divisions below are not the only ways harmful interference can be divided into several subproblems, and may not include all the issues that are needed, but they show the complexity and multiple facets of the problem.

For topics in which there are applicable ITU-R recommendations,²⁸ or industry standards,²⁹ these standards could serve as the starting point for FCC and NTIA clarifications. The prerequisite expertise is available because U.S. experts actively participated in the developing ITU-R recommendations and industry standards; and in most cases, initiated the proceedings and provided technical leadership.

I/S PROTECTION AT RECEIVER

Fortunately, the issue of how much protection a receiver needs has gotten much simpler in the today's digital age. NTIA's survey study found *"(o)ne common feature was that for continuous, long-term interfering signal levels, nearly all established IPC were based on an interference-to-noise power ratio of -6 to -10 dB."*³⁰ In the days of analog signals, acceptable I/S ratios varied all over the place, depending on the nature of both the desired and interfering signals. Indeed, analog NTSC TV needed I/S less than -40 dB for some types of interfering signals. Relatively little uncertainty exists for most digital signals, about how much protection they need at the receiver.

For TV broadcasting, there is an ITU-R recommendation on *"protection criteria"*³¹ recommending that the total interference at the receiver from all radiations and emissions without a corresponding frequency allocation should not exceed 1 percent of the total receiving system noise power. Further, the total interference at the receiver, arising from all sources of radio-frequency emissions from radiocommunication services with a corresponding co-primary frequency allocation, should not exceed 10 percent of the total receiving system noise power. This recommendation should be used as a starting point for determining what clarification on I/S protection is appropriate for TV broadcasting, subject to FCC jurisdiction.

However, for Code-Division Multiple Access (CDMA) systems, such as 2G and 3G cellular, I/S translates directly into cell site capacity—as the cellular industry repeatedly reminded the FCC during the UWB³² and Interference Temperature³³ rulemakings. This relationship between I/S and capacity is because of the nature of CDMA, where the receiver sees multiple signals overlapping in frequency and sorts them out by processing gain. While ideally the CDMA signals are orthogonal, in reality there is some intersignal leakage in the receiver, and the amount of noise in the receiver limits how many CDMA signal can share the same spectrum block for a base station. In effect, the impact of interference to CDMA systems is very different than the impact to other systems, where it either causes interference or doesn't.

In the UWB proceeding, cellular interests tried to argue for very strict emission limits, and allowable interference from UWB to PCS. Qualcomm said the FCC should define harmful interference as any UWB emission that is greater than 6 dB below the thermal noise floor of the PCS receiver. Motorola based its

28 <http://www.itu.int/pub/R-REC>

29 e.g. Telecommunications Industry Association, Interference Criteria for Microwave Systems, 06/94 (http://global.its.com/search_res.cfm?RID=TIA&INPUT_DOC_NUMBER=TSB-10)

30 NTIA Report 05-432, *op. cit.*, p. ii

31 ITU-R, Recommendation BT.1895, Protection criteria for terrestrial broadcasting systems, 05/2011 (http://www.itu.int/dms_pubrec/itu-r/rec/bt/R-REC-BT.1895-0-201105-11!PDF-E.pdf)

32 FCC, ET Docket 98-153

33 FCC, ET Docket No. 03-237

definition of harmful interference on a PCS receiver, as any signal that causes a 1 dB rise in the receiver thermal noise floor, i.e., resulting from an UWB device that produces signal in the PCS receiver that is 6 dB below the thermal noise floor.³⁴ The FCC ultimately decided that “a PCS received signal level of – 96 dBm/1.25 MHz adequately characterizes a low level PCS signal level based on real world applications” and “that a S/I of about a 6 dB is required to prevent interference to a PCS system.”³⁵

Such decisions for CDMA systems are very difficult, but they are the core of the harmful interference issue. One motivation for the ill-fated *Interference Temperature* rulemaking³⁶ was to solve this problem in a more general case, so that licensees would have a clear and long-term understanding of how much interference they would have from other signals and natural sources. Ultimately the FCC found that “(c) ommenting parties generally argued that the interference temperature approach is not a workable concept and would result in increased interference in the frequency bands where it would be used.”³⁷ Unfortunately, for clarifying harmful interference, one has to make this type of decision one way or another.

I/S POWER FLUX DENSITY AT THE ANTENNA OR I/S POWER AT THE RECEIVER

In the past, mobile antennas were omnidirectional and other antennas had fixed patterns. In such a scenario, one could reasonably consider the worst case transfer of interference-to-signal (I/S) power flux density ratio at the antenna to I/S power ratio at the receiver to be the same. In the DBS/MVDDS controversy, the DBS antenna was a directional dish antenna, and the interference path involved the back lobe of the victim antenna—for which there was no clear performance standard.

Thus, the I/S power in space at the antenna was inevitably very different than I/S ratio at the receiver input.

Furthermore, MIMO antenna technology is now well established in the commercial world, and will be even more important in the future. MIMO and other adaptive antenna technologies can readily change the I/S ratio at the receiver, by preferentially passing the desired signal and not the interference. Thus, for systems that either use or can be reasonably be expected to use such technology, any harmful interference regime will have to consider how much to budget for I/S reduction attributable to the antenna system.

PROPAGATION MODELS

Assuming one knows what I/S ratio at the receiver antenna would be acceptable, how would one translate that into acceptable geometries and transmitter power for the new entrant? The answer involves projecting geometry and power with both scenarios and propagation models.

Propagation would be simple if all radio waves behaved like light in a vacuum, with monotonic predictable decrease in field strength, with path length increases. Some radio signals are actually rather close to that ideal theory: satellite links at high elevation angles in clear weather and fixed microwave links with high gain antennas in clear weather. However, other radio systems have much more complex

34 FCC, *First Report and Order*, Docket 98-153, (Feb. 14, 2002) at para. 152-161 “UWB R&O”

35 *ibid.*, at para. 162

36 FCC, *Notice of Inquiry and Notice of Proposed Rulemaking*, Docket 03-237, (Nov. 13, 2003) (http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-03-289A1.pdf)

37 FCC, *Order*, Docket 03-237 May 2, 2007 (http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-03-289A1.pdf)

propagation and uncertainty resulting from multipath propagation and weather related phenomenon. So, agreeing on a propagation model is a major issue.

The impact of propagation models was shown in the TV White Space Proceeding,³⁸ where the broadcast interests urged use of the FCC R-6602 model,³⁹ first published in 1966 and the basis for the FCC's Grade B contours. While this model was a breakthrough for its time and appropriate for the contemporary desktop calculators and paper maps of its time, it does not give the more accurate results possible today, with computer-based models using digital terrain models.⁴⁰

It seems realistic harmful interference determinations will depend on realistic propagation modeling—something that some segments of the wireless community would like to avoid, if traditional models give them a better position.

MCL VICE STOCHASTIC MODELING

The issue of *minimum coupling loss*(MCL) is also key in any harmful interference formulation. In the AWS-3 proceeding, incumbent licensees argued that protection from proposed AWS-3 band TDD emitters to incumbent lower adjacent band FDD downlink mobile receivers must be based on MCL—the worst case scenario. In stochastic modeling, geometries are considered along with their probabilities yielding a probability estimate for interference. Generally incumbents prefer MCL analysis, as it precludes any probability of interference independent of any public interest factors. On the other hand, new entrants would like to show that interference is minimal, and does not meet with the “*seriously degrades, obstructs, or repeatedly interrupts*” part of the harmful interference definition.

At present, the FCC does not have a clear policy on when MCL or stochastic models should be used. This policy absence was a definite factor in the prolongation of the AWS-3 deliberations.

It appears that NTIA insists on MCL for all “safety services,” although it is unclear if NTIA considers *all* federal government spectrum use to be a safety service or not.

Uncertainty over harmful interference would decrease, if the NTIA and the FCC would clarify when it is appropriate to use MCL for interference determinations, and what approaches to stochastic modeling are appropriate for harmful interference determinations. It is likely that some agency-funded research might be needed to guide the FCC and the NTIA in the use of stochastic modeling. But ITU-R and

38 FCC, ET Docket 04-186

39 J. Damelin, W. Daniel, H. Fine and G. Waldom *Development of VHF and UHF Propagation Curves for TV and FM Broadcasting*, FCC, Office of Chief Engineer, Research Div., Report No. R-6602, September 1966 <http://www.fcc.gov/oet/info/documents/reports/R-6602.pdf>

40 In Docket 98-201, the Commission stated:

“The Commission’s traditional predictive methodology for determining a Grade B contour is inappropriate for predicting signal strength at individual locations. Our rules state that this methodology is for three purposes only: (1) estimation of coverage resulting from the selection of a particular transmitter site, (2) problems of coverage related to 47 C.F.R. § 73.3555 (ownership restrictions), and (3) determination of compliance with § 73.685(a) concerning minimum field strength over the principal community. The traditional methodology predicts signal strength on the basis of average terrain elevation along radial lines extending only ten miles from a television station’s transmitter. The traditional methodology does not accurately reflect all the topographic differences in a station’s transmission area, and explicitly does not account for interference from other signals. These omissions make it an imperfect methodology for predicting whether an individual household can receive an adequate signal. For example, the model may fail to account for terrain features that could block a house’s reception.”

R&O, Docket 98-201 (February 2, 1999) at para. 67

European regulators using stochastic modeling shows that it can be useful in equitably resolving contentious interference issues.

MINIMUM PROTECTION DISTANCE

A close relative of the MCL issue is the question of minimum protection distance. Or how physically close a new entrant might be in space to an incumbent's receiver. Since propagated radio signals' strength in a multipath environment is often proportional to $1/d^n$, where d is distance from transmitter to receiver and $2 < n < 4$, simple math shows that as $d \rightarrow 0$ the received power becomes infinite! In the real world, there are either minimal physically possible distances, or minimum distances beneath which a user is causing interference to only himself.

The Commission's landmark 1979 decision on regulations of unintentional emissions from PCs and other "digital devices" stated: *"We are assuming that the home computing device is at least 10 meters from the receiver. The separation distance is a basic parameter in computing tolerable levels of signal that may be radiated by a computer."* And then picked an emission level that would not cause interference to TV receivers at 10m distance, even though industry recommended a 30m minimum protection distance.⁴¹ In the UWB case, the FCC limits were based on an assumption of 2m minimum separation distance between portable UWB transmitters and GPS receivers,⁴² and 1.8m away from PCS receivers.⁴³

In the AWS-3 case, cellular interests argued that minimum separation (and MCL determination of its impact) should be 0.5m, based on a scenario where two cell phone users are in adjacent seats on a bus or train and hold their cell phones to opposite ears so that the interphone spacing is small. While this preceding is nominally still pending, the applicant with the controversial TDD proposal for the band was dismissed with a widely reported⁴⁴, but undocumented phone call from FCC to the applicant so there was no actual determination of what the minimum separation distance should have been was mandated or any of the other technical issues involved in the harmful interference controversy for the proposed TDD use of the band.

ACCEPTABLE INTERFERENCE STATISTICS

What does the harmful interference definition mean with respect to interference that *"seriously degrades, obstructs, or repeatedly interrupts?"* This question has rarely come up in FCC deliberations, but was a key issue in the MVDDS/Northpoint proceeding. DBS satellite systems have natural outages that result from excessive desired path lost during heavy rain. For typical home antennas in the Washington, D.C. area, this comes to about 120 minutes/year. The DBS operators argued that *any* increase in outages over this naturally occurring level would be harmful interference. The Commission ultimately decided that

41 FCC, *Report and Order*, Docket 20780, (Sept. 18, 1979), 79 F.C.C.2d 28, at para. 53

42 FCC, *UWB R&O* at para. 107

43 *ibid.*, at para. 162

44 On September 1, 2010 *ars technica* reported:

"Wednesday M22 informed the press that the FCC has told the company and its backers that the Commission is dropping the concept, and that is so:

'We gave careful and thorough consideration to the proposal, but ultimately determined that this was not the best policy outcome,' Ruth Milkman, chief of the FCC's Wireless Bureau told us. 'We remain vigilant in our efforts to facilitate the universal deployment and adoption of broadband, especially through the much-needed reform to the Universal Service Fund.' " <http://arstechnica.com/tech-policy/2010/09/plan-for-nationwide-free-wireless-broadband-finally-shot-down/>

Similar accounts are in the following contemporaneous reports: <http://www.dsireports.com/shownews/M22-Free-National-Wireless-Broadband-Plan-Finally-Dies-110213>; <http://wirelessweek.com/News/2010/09/carriers-M22-network-hopes-crushed-by-FCC/> however no documents on this change of FCC deliberations are in the proceeding file in Docket 07-195, <http://apps.fcc.gov/ecfs/proceeding/view?name=07-195>.

de minimis increases would not be harmful, and based in technical rules on an objective of increasing rain related outages by no more than 10 percent⁴⁵ over the naturally occurring outages—actually the naturally occurring outages predicted by a standard ITU-R model.⁴⁶

The Commission tried hard to limit this outage increase precedent to only the MVDDS issue at hand; this point is key in harmful interference. Is interference, caused by any new entrant that is *de minimis* with naturally occurring outages in space or time, really “harmful”? Most incumbents want to believe that they have perfect coverage within their nominal service area. But in most cases, they *don’t*— due to factors such as multipath propagation, terrain shielding, limits of real receiver with respect to dynamic range and selectivity, and weather-related phenomena.

In the case of the low-power Frequency Modulation (FM) rulemaking, incumbent broadcasters pointed out expected coverage losses near low-power entrants on adjacent frequencies, when typical receivers’ performances were considered. However, they made no comparisons of the magnitude of these outages with the base case: existing outages with typical consumer FM broadcast receivers near other FM stations.

In considering a harmful interference regime, the NTIA and the FCC should consider the realistic coverage and reliability of a nonsafety service incumbent, along with an estimate for its improvement with new technology, as the base case to compare the impact of any loss resulting from a new service. This comparison would be a useful generalization of the MVDDS 10 percent increase case, with the percentage change in allowed outages considered in the context of the incumbent service and the new service.

POSSIBLE PROCEDURAL APPROACHES FOR CLARIFYING HARMFUL INTERFERENCE

It is doubtful the FCC could develop and adopt a realistic and constructive harmful interference proposal using only the standards notice and comment rulemaking procedure normally used, although such a rulemaking will almost certainly be necessary in the final stages of clarification. Similarly, the normal procedures of the NTIA and IRAC under present legislation and practices focus so much on the rights of the individual member agencies of IRAC, that the overall “public interest” of the *Communications Act* may not get adequate attention. Then, it becomes necessary to develop a compromise solution that advances the public interest—unlikely in the present FCC and NTIA structure(s).

It is interesting to look at spectrum management in Europe, where there are two separate spectrum management entities: the traditional Conference of Postal and Telecommunications Administrations (CEPT)⁴⁷ that developed from the classic monopoly PTTs; and the newer Radio Spectrum Policy Group/RSPG⁴⁸, a European Commission organization. In the CEPT, as in the FCC and NTIA, the incumbents have significant influence over the direction of policy, particularly with respect to protection of incumbents

45 FCC, *Memorandum Opinion and Order and 2nd Report and Order*, Docket 98-206, April 11, 2002 at p. 29

46 In reality, heavy rain statistics vary greatly from year to year. Also the ITU-R model only has data for a grid points about 60 miles apart and uses linear interpolation between data points. As a result, actual rain rates and the resulting satellite outages during a given year at a given place may vary widely from the predicted data. The real impact of a 10 percent increase would be impossible to differentiate over the base case.

47 <http://www.cept.org/>

48 <http://rspg.groups.eu.int/>

from either interference or competition. By contrast, RSPG is more focused on contributing to overall European economic and social goals, and less concerned about the near-term impact on incumbents.

In the 1970s, when the FCC faced challenging paradigm shifts with respect to both satellite/terrestrial sharing of C band and telephone interconnection/Carterphone policies⁴⁹, it turned to the well-respected National Academy of Sciences/National Research Council to develop policy proposals for its consideration; and based the ultimate rules in Part 25 and Part 68, in great part, on those recommendations. This type of bold step may be necessary to break from the past deadlock. Alternatives might include the President appointing a "Blue Ribbon Commission," to consider spectrum reform, or using a subcommittee of the President's Council of Advisors on Science and Technology (PCAST) to formulate basic recommendations.

CONCLUSIONS

For at least two decades, the United States has had a deregulatory policy for most wireless technology. This policy has brought us leadership in areas such as Wi-Fi and CDMA. But wireless innovation is impeded by excessive regulatory uncertainty, resulting from the vague definition of "harmful interference," and the inability to resolve related novel questions in a timely and transparent manner.

By contrast, our foreign competitors operate in spectrum policy systems that are a form of "state capitalism," and where spectrum policy is a key aspect of national industrial policy. The consensus nature of these processes inhibits wireless "disruptive innovation," but eliminates almost all regulatory risk. If the United States cannot make its deregulatory spectrum system function reasonably for innovative technologies, the private sector funding for innovative research may well dry up, as capital sources seek non-U.S. nations with less regulated fields, or with more transparent regulation, e.g., FDA-regulated pharmaceuticals and medical technology.

This White Paper outlines the various technical subproblems involved in harmful interference determinations. While an unambiguous definition of harmful interference is almost certainly an unachievable goal, progress in clarifying some, or all of the subproblems, would improve transparency in harmful interference deliberations. The clarifications need not be an explicit statement in each case, but could be a clear list of alternative approaches and factors used to determine when each alternative should be used.

The process used at the FCC and the NTIA to make harmful interference determinations, including the role of technical advisory committees and outside experts, should also be clarified.

⁴⁹ Panel on Common Carrier/User Interconnections; Computer Science Engineering Board; National Academy of Sciences, *A Technical Analysis of the Common Carrier/User Interconnections Area*, June 1970, (http://www.nap.edu/catalog.php?record_id=13320)

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Highest and Best Use Should Govern Spectrum Policy

At a time when digital connectivity is critical to our way of life, spectrum can mean the difference between having access to quality healthcare via telemedicine and being stranded in the middle of nowhere with no one to answer your calls for help when your car breaks down. Spectrum powers the way we do business and how we educate our children. It impacts the way we monitor our health and manage our daily lives. And because of the way it affects our ability to communicate, spectrum can profoundly impact how we pursue broader social, cultural, economic, and political goals.

Given the wide-ranging uses for spectrum and its increasing value to our society, Congress ought to adopt and employ a “Highest and Best Use” approach as it looks to update the 1996 Telecommunications Act and create a new framework for Federal Communications Commission oversight and administration of spectrum auctions. The focus of such a standard should be on placing spectrum in the hands of those best situated to put the scarce resource to its highest and best use.

[Studies](#) have shown that the federal government is not the most efficient user or manager of spectrum and that private enterprise is better equipped to handle issues of allocation and use. Companies like Verizon, AT&T, and Grain Communications have an incentive that the federal government does not to be as efficient as possible at managing spectrum – the need to balance growing consumer demand against ever-present investment and innovation decisions. The private sector has been instrumental in supporting the build out of spectrum intensive products and services over the past several years and is well equipped to help optimize growth in this sector. Therefore, to ensure optimal management of this critical resource, any Communications Act Update should direct to mobile providers greater amounts of available mobile spectrum. Doing so would help guarantee that spectrum can be used in the most efficient manner possible.

Even as private interests are best suited for spectrum management, there is a great public good that must be served by the spectrum currently available and in the pipeline to the market place. Here’s where the federal government comes in, to ensure that the public interest continues to be met. As examples, ensuring quality access for public safety communications and incentivizing increased participation by minorities and women as spectrum licensees are things that should fall squarely within the authority of the FCC under a revised Act. Moreover, the Commission should continue to have oversight of the private sector in its management of spectrum, but such review should not be proscriptive. Rather, it should seek instead to address actual harms once they occur.

Applying the highest and best use standard requires that spectrum be used as efficiently as possible to meet consumer demand and support the public interest. Spectrum is only as useful as the people it’s able to reach and the services it can help provide. As Congress pursues a #CommActUpdate, it should focus on how to create the greatest opportunity to leverage

spectrum as a critical infrastructure necessary for American prosperity and global competitiveness.

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COMMENTS TO HOUSE ENERGY AND COMMERCE COMMITTEE ON THE SPECTRUM POLICY WHITE PAPER OF 4/1/14

Marcus Spectrum Solutions LLC (MSS) welcomes the opportunity to comment to the House Energy & Commerce Committee on its white paper on spectrum policy.

MSS is the consulting practice of Michael J. Marcus Sc. D., F-IEEE, a retired FCC senior manager perhaps best known for proposing and creating the regulatory foundation for what is now Wi-Fi and Bluetooth¹ and also for the rules that opened up spectrum for commercial use at 60, 70, 80, and 90 GHz². He was elected a Fellow of the IEEE “for leadership in the development of spectrum management policies” and was awarded the IEEE Communications Society’s 2013 Award for Public Service in the Field of Telecommunications “for pioneering spectrum policy initiatives that created the modern unlicensed spectrum bands for applications that have changed our world”. These comments reflect the views of MSS only and not necessarily those of its clients or any other groups.

The suggestions below are intended to be both nonpartisan and neutral with respect to various industries regulated by FCC. While criticism of FCC is presented, the root causes evolved over several decades under leadership of both parties and many chairmen.

¹ <http://www.marcus-spectrum.com/page4/SSHist.html>

² <http://www.marcus-spectrum.com/page5/index.html>

MSS also commends to the Committee the recommendations of IEEE-USA, the US engineering professional society, that are given in two documents he helped draft:

- “Position Statement on Improving U.S. Spectrum Policy Deliberations in the Period 2013-2017”³ -
- “Clarifying Harmful Interference Will Facilitate Wireless Innovation”⁴

Question 1: What structural changes, if any, should be made to the FCC to promote efficiency and predictability in spectrum licensing?

When FCC was created in 1934 the world was much simpler than today and the FCC had a somewhat different structure than today although it was not reflected in the statute. Like the Interstate Commerce Commission that was the predecessor to the FCC’s Title II jurisdiction, the initial 7 commissioner FCC divided itself into 3 “divisions” of 3 commissioners at creation in 1934 – dealing with: telephone, telegraph, and radio.⁵ The original intent was that the whole commission would meet *en banc* for issues affecting multiple industries or key decisions. Note that this was prior to the 1946 Administrative Procedures Act (APA) when the procedures for adopting and enforcing rules lacked today’s checks and balances, but were also much faster. Note also that prior to World War II the maximum frequency of practical use and the number of technological options for radio technology were very limited. While the 1934 FCC Annual Report mentioned in passing the “possibility” of VHF use “above 30 megacycles” or what would be called 30 MHz today, the highest frequency mentioned in actual routine use was 2.5 MHz.

At the same time of the arrival of the APA in 1946 came the postwar rapid explosion of available spectrum for practical use, many new technologies for using that

³ <https://www.ieeeusa.org/policy/positions/SpectrumPoilcy1112.pdf>

⁴ <http://www.ieeeusa.org/policy/whitepapers/IEEEUSAWP-HarmfulInterference0712.pdf>

⁵ <https://www.fcc.gov/reports/1st-annual-report-congress-1935>

spectrum, and an ever expanding categories of uses that have benefited both our economy and our society. But is the FCC, as presently structured able to deal with this workload efficiently? Experience shows that technical spectrum policy decisions are just not keeping up to the pace of today's complex industry. While major players are able to demand timely action on some issues, *e.g.* DTV transition and incentive auctions, even these major players have to choose between which of their actions will get attention in a sort of informal rationing system.⁶ Entrepreneurial firms that are the hot bed of innovation in other technical areas just do not have access to much of the FCC's limited decision-making throughput in the spectrum policy area and as a result get turnaround on technical policy issues that discourages investment in wireless technology requiring nonroutine FCC approvals. Even major incumbents are not getting a timely response of new unanticipated types of interference to their systems that need rulemaking action to resolve.

⁶ We believe that the delays in Docket 10-4, discussed below, in resolving a major interference problem to cellular operators were the result of such a rationing effect. Cellular interests could not both get the spectrum they wanted and push for timely action in resolving a new interference source that posed complex policy problems. They probably chose to press for new spectrum and tolerate slow action on the interference so as not to exceed their ration of FCC's attention.

Consider the following table on noncontroversial spectrum dockets to allow incremental use of new technology.

| Docket No. | Request | Start | End | Duration |
|---|--|-------------------------|------------|-------------------|
| WT 04-143 | rulemaking – adding narrower bandwidths to 18 GHz fixed service band | 05/04/2001 ^a | 12/29/2006 | 66 mos. |
| ET 98-156 | rulemaking – directional unlicensed power at 24 GHz | 10/20/1997 | 02/13/2002 | 52 mos. |
| WT 07-54 | rulemaking – smaller antennas in 11 GHz fixed service band | 07/14/2004 | 10/31/2007 | 39 mos. |
| ET 99-231 | rulemaking – unlicensed Wi-Fi “g” standard (digital modulation devices) | 02/17/2000 ^b | 07/25/2002 | 27 mos. |
| ET 06-195 | waiver – UltraVision Security Systems perimeter security device | 10/06/2006 | 11/20/2008 | 25 mos. |
| ET 04-373 | waiver – SafeView security screening device | 08/18/2004 | 08/04/2006 | 24 mos. |
| WT 09-114 | rulemaking – conditional licensing on additional channels in 23 GHz fixed service band | 11/07/2007 | (pending) | 23 mos. (to date) |
| ET 00-47 | rulemaking – software-defined radios | 03/21/2000 | 02/04/2002 | 22 mos. |
| WP 08-63 | waiver – ReconRobotics surveillance robot | 01/11/2008 | (pending) | 20 mos. (to date) |
| WT 09-114 | rulemaking – adding wider bandwidths to 6 GHz fixed service band | 02/04/2008 | (pending) | 20 mos. (to date) |
| WP 09-2 | waiver – L-3 CyTerra public safety radar | 02/22/2008 | (pending) | 19 mos. (to date) |
| NOTES (a) Date of <i>ex parte</i> statement in IB Docket No. 98-172 proposing 18 GHz channel plan. (b) Date on which Wi-LAN, Inc. filed an Application for Review of denial of certification of an OFDM device under § 15.247. The Commission effectively treated that application as a petition for rulemaking. <i>Spread Spectrum Devices</i> , 16 FCC Rcd 10036 (2002). | | | | |

Figure 1: Duration of Noncontroversial Spectrum Dockets at FCC⁷

Note that this listing does not include very controversial spectrum issues such as the M2Z/AWS-3 proceeding or the ongoing issue of LightSquared and GPS. It is likely that the speed and transparency issues associated with FCC deliberations on new technologies needing nonroutine approvals are discouraging capital formation for such technologies and thus damaging US technological competitiveness.

⁷ Comments of Mitchell Lazarus, Docket 09-157, September 30, 2009⁷ at p. 5)<http://apps.fcc.gov/ecfs/document/view?id=7020039921>

Qualcomm, a major US wireless technology innovator, was incorporated in July 1985. Its original products were satellite-based and did not need nonroutine FCC approvals, but its “killer app”, CDMA cellular, did. Qualcomm was fortunate in that in a 1987 decision FCC decided to deregulate the choice of 2G technology for a variety of reasons, thus assuring market access for Qualcomm’s main product and early key money maker. Whether this 2 year turnaround in the 1980s was good luck or good lobbying doesn’t matter, because such turn around for new technologies is virtually inconceivable with FCC actions of the past 2 decades.

Most of our foreign competitors in information communications technology (ICT) use a “state capitalism” model for fostering their communications technology industries. That is not our system and should not become our system, but we have to recognize what our competitors are doing and make sure our regulatory system does not operate in a way that puts us at a competitive disadvantage. Our competitors subsidize with government funds research projects in communications technology to develop new products for their industries. Once public funds have been invested in radio technologies, the natural tendency of bureaucrats to make their projects successful leads to few doubts about regulatory approval for the new radio technology. For example, German laboratories are now developing with national funding new very high speed point to point microwave system at 237 GHz that achieved a record 100 Gb/s throughput⁸. Meanwhile FCC’s rules for the upper end of the spectrum remain limited to frequencies below 95 GHz, a limit reached in October 2003 in Docket 02-146.⁹ Can US firms compete on new radio

⁸ <http://spectrum.ieee.org/telecom/wireless/a-new-record-for-terahertz-transmission>

⁹ Actually it is even worse: In the Report & Order in Docket 10-236 (http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-13-15A1.pdf) FCC forbids (revised 47

technologies with foreign firms that have both national research subsidies and negligible regulatory risk? Shouldn't the US level the playing field by at least giving US developers timely go/no go answers on innovative wireless technology?

FCC technical spectrum policy is not just slow with adapting for the use of innovative technology, it is also slow in addressing interference to incumbent users – even incumbent users who have major influential trade associations like CTIA - that arises from unexpected sources that are legal under present FCC rules because the intersystem interaction was not anticipated. Such “emerging interference” issues are probably inevitable to some degree in a rapidly evolving industry, but they need to be recognized and address in a timely basis. Let us consider 2 topics that dragged on for years with ongoing interference to incumbents while the issues were pending.

C.F.R. 5.85(a)) without any explanation any experiment in a band with only passive allocations for the first time. This applies even if there are no passive users that might be impacted by the experiment in an area. Since there are many such passive bands above 95 GHz and few components at such frequencies are readily available this prohibition greatly complicates US experimentation. Indeed, the German experiment discussed might have been impossible under this new FCC rule. A timely reconsideration petition on this issue from MSS (<http://apps.fcc.gov/ecfs/document/view?id=7022416291>) that has been supported by Boeing and Battelle Memorial Institute has been pending at FCC for over 10 months. It seems likely that the sentence restricting all experiments was simply placed in the wrong paragraph of the rules.

First, the interference between “cellular booster amplifiers” and cellular operators that became the main subject of Docket 10-4. On May 1, 2006, CTIA submitted to the FCC staff “WHITE PAPER ON THE HARMFUL IMPACTS OF UNAUTHORIZED WIRELESS REPEATERS” that contained the following clear and unambiguous statement :

V. FCC ACTION IS URGENTLY NEEDED

Figure 2: Section heading of CTIA White Paper Submitted to FCC 5/5/06¹⁰

While this white paper is dated May 2006, it is likely that CTIA discussed this issue informally with FCC staff at an earlier date as it is clear from the white paper that some time had passed since the problem was first recognized.

Here are the key milestones in the resolution of this issue:

| | |
|-------------------|--|
| May 1, 2006 | CTIA white paper given to FCC |
| November 2, 2007 | CTIA petition for rulemaking |
| January 6, 2010 | FCC public notice initiating Docket 10-4 |
| April 6, 2011 | FCC NPRM |
| February 20, 2013 | FCC Report & Order |
| April 30, 2014 | Effective date of new rules |

Table 1: Timeline of Docket 10-4

This is just one example of FCC delays in dealing with new interference sources to incumbent users. Consider the case of Docket 01-278 that dealt with interference from police radar detectors (illegal in 20+ states including Virginia) to VSAT receiver systems. The NPRM for this proceeding introduces it with this sentence, “More recently, however, we have received a number of reports of interference caused to very small aperture

¹⁰ http://files.ctia.org/pdf/filings/FINAL--CTIA--_Jammers_Petition_for_Declaratory_Ruling.pdf
At .pdf p. 45 (Whitepaper p. 14)

satellite terminals (VSATs) by mobile receivers designed to detect the presence of police radar ('radar detectors')."¹¹ (Emphasis added)

While the radar detector issues in Docket 01-278 were resolved in less than a year after the NPRM, the introduction in the NPRM "fuzzifies" the real history of this problem. The author knows that a VSAT system operated by FEMA used at the site of the April 19, 1995 Oklahoma City bombing disaster received interference and was unusable. FCC enforcement personnel at that time quickly realized that due to numerous previous incidents the most likely source was police radar detectors' excessive, but then unregulated, emissions from vehicles driving on an undamaged highway near the disaster scene. (Previously FEMA had used the VSAT system successfully for disasters such as earthquakes, hurricanes, and tornadoes where there was little high speed traffic in the disaster area.) While the author has no clear documentation, he is certain this problem was well known to the FCC staff at least a decade before the Docket 01-278 NPRM.

In the case of Docket 10-4, perhaps the cellular industry was implicitly or explicitly given the choice by FCC of prioritizing either the cellular booster interference problem or their quest for 500-700 MHz of additional spectrum. Perhaps they chose the additional spectrum as their highest priority. But is this the proper way to deal with spectrum policy? Do incumbent spectrum users have to choose between *either* stopping ongoing interference to their licensed spectrum or FCC addressing needs for new spectrum? If true, isn't this a sign that FCC as presently structured does have the decision making throughput to handle the technical aspects of its spectrum policy job under the 1934 Act? There are some issues that need the insights of presidential

¹¹ NPRM Docket 02-478 (October 15, 2011) at para. 11
(http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-01-290A1.pdf)

appointees confirmed by the Senate. These include the public interest issues on the merits of spectrum use A versus spectrum use B. For example, consider these questions:

- Was the potential interference from M2Z's proposed use of AWS-3 spectrum to adjacent channel licensee under some circumstances acceptable in light of the new service they might offer?
- Is the potential interference from LightSquared to some GPS applications in some circumstances acceptable given the benefits of the proposed new service?
- Is the proposed new use of current broadcast spectrum by CMRS licensees in the incentive auction rulemaking acceptable given the decrease in over-the-air broadcasting and the resulting new interference from CMRS to TV broadcasting?

But this weighing of the merits of alternative spectrum uses in the public interest is very different from the increasingly technical issues in spectrum management. For example, as part of the above 3 questions, someone has to determine

- How much interference might M2Z cause to the adjacent channel licensee and what are the options to reduce this to a lesser level?
- How much interference might LightSquare cause to various classes of GPS users and what options are available to minimize that?
- How to quantify CMRS/TV interference given a spectrum plan and transmitter locations?

Note that the second group of questions are very different from the first group although they deal with the same basic subject matter. These are questions that are not natural ones for the FCC commissioners of the past 30 years with their backgrounds. Thus the Commission as presently formulated does a good job with the first set of questions but a poor and slow job with the second set. Perhaps in 1934 when there were fewer and simpler technical questions and no APA the present FCC structure could

handle these issues efficiently, today it is just falling behind with a throughput unable to keep up.

Here are some suggested options based on the IEEE-USA recommendations and experience at other agencies with technical jurisdiction:

1. While the FCC's Technological Advisory Committee (TAC) does a good and useful job representing the views of FCC regulatees and addressing long term issues not now on the FCC's agenda, it is unable because of its structure to help the FCC on substantive issues that need timely resolution because its members mostly represent specific interests. FCC structured it this way in great part to avoid paying the members. But EPA, NRC, and FDA have paid advisory committees of members without conflicts (e.g. academics and industry retirees) that take an active role in help those agencies resolve complex technical issues analogous to the first 3 questions above. While FCC *could* create such a committee without legislative action, the present funding situation making that unrealistic. The EPA, NRC and FDA committees have a statutory mandate that facilitates funding in the appropriation process. Legislation should be explored to create analogous provisions for FCC. In particular a new technical spectrum policy committee with paid members lacking conflicts of interest and with security clearances could be in a position to provide neutral technical advice on the implications of possible decisions and possible options to FCC, NTIA, and the White House Spectrum Management Team. Such a committee should and will not duplicate the roles of the present FCC TAC and NTIA CSMAC, but

rather perform roles on ongoing spectrum deliberations that TAC and CSMAC have been unable to do because of their structure.

2. Decades of low funding at FCC have made it almost impossible to use outside consultants to assist deliberations on novel technical matters. However in the past a few studies but outside contractors have had major impacts. A 1980 study¹² by MITRE Corp. was the first place that the idea of unlicensed use in the ISM bands was broached. This idea was subsequently fleshed out in an FCC rulemaking and became the foundation of Wi-Fi, Bluetooth, ZigBee and several other technologies that have changed our world. The \$55,652 paid for the study in 1980 dollars, even if adjusted for inflation has perhaps been the best investment the federal government has ever made in terms of GDP impact. Another study¹³, also by MITRE, was ordered by legislation¹⁴ and resulted in a timely resolution of the complex MVDDS/Northpoint controversy that vexed the FCC for several years.¹⁵ Yet FCC lacks the funding for such studies to complement its internal resources even though other agencies use outside to studies to perform their goal. NRC routine contracts with DOE national

¹² MITRE Corp., "POTENTIAL USE OF SPREAD SPECTRUM TECHNIQUES IN NON-GOVERNMENT APPLICATIONS" (MTR80W00335), December 1980, <http://www.mitre.org/sites/default/files/pdf/MTR80W335.pdf>

¹³ MITRE Corp., "Analysis of Potential MVDDS Interference to DBS in the 12.2–12.7 GHz Band" (MTR 01W0000024). April 2001

¹⁴ Section 1012, Prevention of Interference to Direct Broadcast Satellite Services, of the Commerce, Justice, State and Judiciary Appropriations Act, H.R. 5548, Pub. L. No. 106-553, 114 Stat. 2762A-141 (2000).

¹⁵ MSS has no connection to MITRE Corp. and is not recommending them explicitly as a support contractor for FCC. The 2 good examples of support work that expedited policy issues happen to be from MITRE. There are several other Federally Funded Research and Development Centers (FFRDCs) as well as some private entities that could compete to serve such functions on an as needed basis if Congress encouraged FCC to seek outside help on novel technical issues and provided the resources to do so.

laboratories for technical support even though its inhouse technical staff dwarfs FCC's and its commissioners have more background in the technical issues of its jurisdiction than recent FCC commissioners have had.

3. Many years ago FCC had a Review Board that acted under delegated authority pursuant to §5(c) to act on matters generally dealing with broadcast ownership issues. This was a board of career FCC staffers that reviewed ALJ findings and made decisions that could be appealed to the Commission. We believe that in a parallel way FCC could create a board of senior career employees, perhaps with an academic on sabbatical as a member to add some outside insight, to handle noncontroversial spectrum policy issues and technical subproblems of controversial spectrum issues - such as the second set of 3 questions given above. This board might be called the Spectrum Technical Policy Board and could speed deliberations on many technical spectrum issues as well as decrease the workload of the commissioners by removing *de novo* consideration of many technical spectrum issue from them thus allowing them more time to focus on other key issues in the FCC's jurisdiction. Under the longstanding provisions of §5(c)(4) and the whole Commission could review any decision of this board.

Pursuant to §5(c)(5)

“In passing upon applications for review, the Commission may grant, in whole or in part, or deny such applications without specifying any reasons therefor. No such application for review shall rely on questions of fact or law upon which the panel of commissioners, individual commissioner, employee board, or individual employee has been afforded no opportunity to pass.”

Question 2: Unlicensed Spectrum

The CMRS community has a love/hate relationship with unlicensed spectrum.¹⁶ On one hand they use it heavily for offload of traffic that would otherwise clog their system in congested areas. On the other hand they oppose virtually any new unlicensed spectrum and appear to be the forces behind the ill fated proposed to require an “auction” for any new unlicensed spectrum.

Rather than addressing the general issue, let us help clear up some facts.

1. Most present unlicensed spectrum is spectrum that is just not available to any other use due to the nature of primary allocation in the same band or in adjacent bands. Ultimately, dynamic spectrum assignment, such as is being considered now for the 3650 MHz band, may allow alternative uses for such secondary sharing *in some cases* and when that becomes realistic it should be considered where appropriate. When the 900, 2400, and 5700 MHz ISM bands were made available for unlicensed use in 1985 there was no other interest in such bands by any other users due to the need to share them with ISM systems (*e.g.* microwave ovens) and some primary federal users.
2. There is a real synergy between unlicensed spectrum and technical flexibility in regulations. We believe that the reason why the ISM bands made available for unlicensed use became the “killer app” of today’s Wi-Fi and Bluetooth was the basic flexibility of the rules and the lack of a specific vision by FCC and industry of what applications the rules would

¹⁶ <https://www.google.com/search?q=love%2Fhate+site%3Amarcus-spectrum.com>

be used for. Indeed, few in industry supported the rules and many opposed them in the early 1980s. There is nothing in the record of Docket 81-413 that even hints for the need of radio local area networks (RLANs) before the ISM band rules were adopted in 1985. But there was a real synergy between these flexible unlicensed rules and the recognition in the next few years that RLANs would be needed. Even the initial RLAN product efforts in industry focuses on niche markets such as wireless cash registers for department stores – an area unlikely to have attracted timely FCC interest.¹⁷

By comparison the industry supported petitions for both U-PCS and U-NII had very slow “take up rates”. The supporters of these unlicensed bands had specific markets in mind and wrote complex rules for those markets. The resulting rules were much longer and detailed than the ISM band rules and probably outdated by the time of their final publication in the *Federal Register* and were then protected by the “full faith and credit of the APA” from the needed updating. As we have shown above, such updating requires the type of Commission action that has real throughput problems as FCC is presently structured and probably does not require the participation of 5 presidential appointees with Senate confirmation. **A key lesson is that in order to enable unanticipated applications, unlicensed rules need to be minimalist.** The mere creation of new

¹⁷ Details of the history of Wi-Fi are in this book by several of the early participants of the 802.11 standards group: W. Lemstra, V. Hayes, J. Groenewegen, The Innovation Journey of Wi-Fi, Cambridge University Press, 2011

unlicensed bands will do little to spur creativity if those bands are burdened by detailed rules that limit their ability to evolve quickly as new technology appears and needs for new types of services evolve.

Question 3: What should be done to encourage efficient use of spectrum by government users?

The administration of the President's §305 authority has to be done with national goals as a primary objective. A historical account of IRAC from the early 1960s is contained in a RAND Corporation report by Nobel laureate Ronald Coase that was not released until 1995¹⁸. While the Coase account is 60 years old at this point, the agency parochialism described in it is very reminiscent of the authors contact with IRAC as an FCC senior staffer and on external observables in recent years. The IRAC members need "adult supervision – in the Silicon Valley context – from either an NTIA that really acts like an independent regulator with "tough love" or from a better split of the §305 authority between the White House and NTIA.

Question 4: What other steps can be taken to increase the amount of commercially available spectrum?

While there are many steps that can be taken, one of them should be to expand the upper limit of radio service rules that presently end at 95 GHz, a limit reached 9 years ago.

While FCC has allocations up to 275 GHz and may have jurisdiction as high as 1000 or 3000 GHz, the lack of service rules for either licensed or unlicensed use above 95 GHz

¹⁸ R. Coase, W. Meckling, J. Minasian, "Problems of Radio Frequency Allocation", DRU-1219-RC, RAND Corp., 1995 (<http://www.rand.org/pubs/drafts/DRU1219.html>)

discourages capital formation for R&D while the state capitalism spectrum management system of our foreign competitors speeds on. This is particularly ironic since component technology in this upper spectrum is being driven by US military R&D! The longstanding provisions of §303(g) provide that the Commission shall:

“(s)tudy new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest;” (emphasis added)

This language does not seem to be for an FCC intended to wait, like the Patent Office, for “mother may I?”-like applications to come in from the public for new bands that are presently lying fallow. The 1934 Act appears to have anticipated a pro-active FCC with respect to new technologies. Realities of recent funding levels have limited this, but Congress should address what really are its goals for FCC here.

Question 9: Can engineering and forward-looking spectrum strategies account for the possibility of unanticipated technologies and uses in adjacent spectrum bands?

Better engineering studies can decrease the risk of emerging interference issues that have arisen in the past. However, the only way to bring them to near zero is a return to detailed technical regulation of 4 decades ago that stifled both technical innovation and competition in wireless services. For example, we would never have the CDMA technology that many carriers used for 2G cellular and which was the core of all 3G cellular service worldwide had it not been for the Commission’s 1987 decision to allow multiple 2G technologies subject only to adjacent band emission limits.

However, better technical support for the commission through an active advisory committee that can deal with ongoing rulemakings- unlike the present TAC, but like such

committees at other regulatory agencies - as well as the delegation of technical spectrum issues to an internal board created, as proposed above, under §5(c) of the Act will give more review to these challenges and decrease the number of surprise interactions.

However, it can not realistically prevent all unexpected interference interactions and thus it is important that the Commission must treat “emerging interference” correction through rulemaking as a high priority “product” not as a stepchild as it did in the case of cellular boosters and police radar detector/VSAT interference described above. Today FCC is unwilling to publicly acknowledge a string of interference events from FM broadcast stations to 700 MHz cellular base stations¹⁹ and a smaller, but persistent, number of events from set top TV antennas with builtin amplifiers²⁰ to many other services including cellular and GPS.

FCC must be willing to address such issues on a timely basis unlike its historic approach of focusing mainly on providing new service. The organizational changes suggested above might help achieve this goal, but it could also be accomplished within the present structure if leadership balanced its priorities.

Question 10: NTIA

NTIA was created in 1978 with the transfer of the President’s §305 authority from the White House staff to the Commerce Department and their delegation to the Assistant

¹⁹ <http://www.marcus-spectrum.com/Blog/files/FM2LTEint214.html>

²⁰ It is ironic that the amplifiers in such antennas probably have no positive impact on TV reception in urban areas and may actually have a negative impact through decreasing sensitivity of some stations due to having a higher noise figure than the TV receiver and a greater susceptibility to receiver-generated intermodulation products. Nevertheless such antennas with amplifiers are very common in mass retailers today. While the antennas do not cause interference to other services if designed properly and if they are not damaged, when there is coupling from the amplifier output back to the antenna element there can be resulting oscillations that can impact cellular bands and even GPS, see <http://www.uscg.mil/auxiliary/publications/alcoast/alcoast-298-03.asp>.

Secretary of Commerce for Communications and Information. From 1969 to the creation of NTIA, the Department of Commerce's Office of Telecommunications (OT) had supported the White House staff that acted on behalf of the President's §305 authority – the Office of Telecommunications Policy (OTP) after 1970. But until 1978 a White House official with some staff had final responsibility.

While the 1978 change *may* have been justified and reasonable at that time, it is the root cause of many spectrum problems today. While the Herbert Hoover Building is within sight of the White House, it is a world away in the context of power.

Discussions with OTP alumni consistent reveal how directors like Clay "Tom" Whitehead were able to use their White House positions to directly contact cabinet secretaries whose IRAC members were taking positions that were inconsistent with national goals and priorities. This is something the Assistant Secretary of Commerce for Communications and Information is unable to do no matter how well motivated and skilled the incumbent is.

While the IRAC member agencies are no doubt pleased with the present arrangement, it is simply not conducive to an effective national spectrum policy. (The IRAC membership even successfully fought a Bush (43) Administration proposal to just put NTIA under the Undersecretary of Commerce for Technology who probably was in a better position to lean on cabinet agencies since he was also effectively the CTO at the time.)

The creating of the White House Spectrum Policy Team created by a June 14, 2013 Presidential Memorandum²¹ is a good step forward. But this team seems to have only one full time staffer dedicated to the issue: the Deputy Chief Technology Officer for Telecommunications in OSTP who at present is actually on detail from NTIA. Furthermore, like the head of NTIA, the White House Spectrum Policy Team has no independent place it can go for technical advice or technical options on complex spectrum policy issues and must depend on NTIA's Office of Spectrum Management (OSM) for any technical support. Unfortunately, OSM is in an awkward and confusing role between the NTIA front office and the IRAC and has to choose between the somewhat conflicting roles as:

- IRAC secretariat,
- “recorder of deeds” for federal spectrum assignments,
- the law firm that represents IRAC members to FCC and argues their position, and
- their theoretical role as the independent regulator of federal spectrum use.

While there are other agencies that regulate the activities of federal entities, e.g. GSA, EPA, NRC (with respect to nonmilitary nuclear issues), and OSHA, OSM as presently structured in today's NTIA is just not doing that.

We understand the cost and complexity of government reorganizations and do not want to propose such. But a move back towards the “two body” federal spectrum management structure of the Nixon Era OTP²² in the White House and the Commerce

²¹ <http://www.whitehouse.gov/the-press-office/2013/06/14/presidential-memorandum-expanding-america-leadership-wireless-innovation>

²² The Nixon era OTP had other function besides federal spectrum management. (See http://en.wikipedia.org/wiki/Office_of_Telecommunications_Policy) This suggestion is not urging a complete return to the OTP functionality, rather just bringing the federal spectrum management leadership responsibility back to the White House while keeping the personnel-

Department's OT would address many of the problems. The current NTIA would need little or not change and the present White House Spectrum Policy Team could be established by law with an OTP-like function supervising NTIA similar to the former OTP/OT. The new advisory committee suggested earlier could then provide technical support to both the strengthened White House Spectrum Policy Team as well as NTIA and FCC. (Since the committee is intended to focus on technical issues such as quantifying interference potential and suggesting alternatives, its technical analyses should be neutral with respect to FCC, NTIA, and the White House.

The Problem of Section 7 and Its False Promise

On December 8, 1983 Pub. L. 98-214 was signed by President Reagan and its §12 became §7 of the Communications Act. It begins with the bold words

It shall be the policy of the United States to encourage the provision of new technologies and services to the public. Any person or party (other than the Commission) who opposes a new technology or service proposed to be permitted under this chapter shall have the burden to demonstrate that such proposal is inconsistent with the public interest.²³

30 years of experience under many commissioners and chairmen of both major parties have shown this to have been a false promise and its only impacts may have actually been negative in giving false hope to technical entrepreneurs. Clearly this legislation as adopted has not worked, a fact publicly acknowledged by Commissioner Pai in his first public speech after joining FCC²⁴. A prominent communications attorney

intensive functions in NTIA as they were in the Nixon era OT. We have no view on whether other functions might be brought back to the White House.

²³ 47 U.S.C. §157(a)

²⁴ Remarks of FCC Commissioner Ajit Pai, "Unlocking Investment and Innovation in the Digital Age: The Path to a 21st-Century FCC", Carnegie Mellon University, Pittsburgh, PA, July 18, 2012 http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-315268A1.pdf

even tells clients that they should avoid any mention of §7 in seeking FCC action to enable a new technology because the very mention of it may delay consideration!

§7 should be either repealed or amended to make its provisions more than a false promise. While FCC has promised to resolve complex corporate mergers within “180 days”²⁵ (actually about 1 year of “clock time” when one considers the details of how time is counted) and has done an outstanding job in meeting that goal, it has dismally failed in resolving the issues associated with new technologies that need nonroutine approvals within anything even vaguely resembling the time scale mandated by §7. To be clear, the §7 one year period is an explicit statutory requirement at present while the merger “goal” has no statutory basis.

We suggest that the Congress consider amending §7 to make it parallel the forbearance provisions of §10(c) which the Commission routinely complies with. An alternative might be to delete the explicit deadline altogether but require the Commission to adapt clear rules for handling innovative technology and have a clear and transparent tracking system for such requests modeled after its present tracking system for merger requests.²⁶

²⁵ <http://www.fcc.gov/encyclopedia/informal-timeline-consideration-applications-transfers-or-assignments-licenses-or-authorizations>

²⁶ For an example of current merger tracking see <http://www.fcc.gov/transaction/sinclair-allbritton>

CONCLUSION

We thank the Committee for this opportunity to comment on these key issues and congratulate it on the wise selection of topics raised. We would be pleased to help the Committee and staff in any way dealing with the issues raised above.

Sincerely,

A black rectangular box redacting the signature of Michael J. Marcus.

Michael J. Marcus, Sc.D., F-IEEE
Director



MICROSOFT'S RESPONSE TO THE WHITE PAPER
OF THE COMMITTEE ON ENERGY AND COMMERCE
ON MODERNIZING U.S. SPECTRUM POLICY

April 25, 2014

Microsoft appreciates the opportunity to provide input to the Committee in response to its White Paper on the subject of *Modernizing U.S. Spectrum Policy*. In a mobile and cloud first world, broadband connectivity must be ubiquitous, affordable, and robust. Under this paradigm, Microsoft sees wireless broadband service being delivered over fixed (wireless and satellite), mobile, and nomadic infrastructure. All depend on the availability of spectrum -- a resource in great demand that has been artificially limited by legal and regulatory regimes. And all spectrum is not created equal for wireless broadband communications due to varying atmospheric propagation properties, physical relationships that scale with frequency, and the corresponding capital and operational costs required to put it into widespread commercial use. Microsoft envisions a future in which available spectrum is dynamically shared across a number of complementary bands and under a variety of licensed, unlicensed, and other regulatory regimes. This includes communications devices as well as the Internet of Things. All depends, though, on additional spectrum being made available for sharing. Similar to our approach in responding the Committee's first white paper on the subject of *Modernizing the Communications Act*, Microsoft would like to provide input on some themes that it believes should underlie any consideration of modernizing U.S. spectrum policy and which are of particular importance to the company.

Elevate the importance of Unlicensed Spectrum

It is essential the Committee recognize the tremendous economic value created through use of unlicensed spectrum, the innovation it enables as a result of lowering the barriers to entry for new technologies and service, and the central role it plays today in our wireless broadband infrastructure.

In recent years wireless data consumption has increased dramatically, driven by the increase in the number of connected devices and the skyrocketing demand for video. Despite significant investments on the part of wireless carriers, the network infrastructure deployed for licensed spectrum has struggled to keep pace with demand.

Unlicensed spectrum serves as a vital complement to wireline and cellular broadband technologies by enabling network offload which reduces congestion and facilitating wider geographic coverage through the "networking" of Wi-Fi technology. This results in greater

coverage, more capacity within the network and overall better quality of service. Further, many other unlicensed technologies such as Bluetooth technologies that can be used to connect a mobile device to a car, are made possible by the availability of unlicensed spectrum. A recent study estimated that unlicensed spectrum generated \$222 billion in value to the U.S. economy in 2013 and contributed \$6.7 billion to U.S. GDP.¹

Unlicensed spectrum is also important for providing broadband connectivity to less densely populated areas through Wireless Internet Service Providers. Fixed and personal portable devices using the TV White Spaces offers great potential for low cost communications. Additionally, unlicensed spectrum is integral to the development of the Internet of Things. It is forecast that the number of intelligent connected devices is likely to exceed 100 billion by 2020, with at least 95 percent to 97.5 percent of all connections over unlicensed spectrum.

The challenge is that there is also a limited amount of unlicensed spectrum available in each market. Just as there is a need for Congress, NTIA, and FCC to identify additional spectrum for licensed use, there is a need to do the same for unlicensed use.

The recent FCC Report and Order that opened up an additional 100 MHz of spectrum for outdoor use in the 5 GHz band, and at higher powers is helpful. When finalized, the FCC's Further Notice of Proposed Rulemaking regarding commercial operation in 3.5 GHz band may also make available additional spectrum for unlicensed use, but that spectrum may not become commercially viable unless a national footprint is created either through small exclusion zones to protect federally licensed users or through the ability to dynamically access the federally licensed spectrum at locations, times, and frequencies when not in use by incumbent licensees.

Much more, however, needs to be done to keep pace with expected demand. For these reasons, Microsoft recommends the Committee make significantly more spectrum available for unlicensed use as it seeks to modernize U.S. spectrum policy.

Improve Spectrum Efficiency

It cannot be overstated that spectrum is a limited resource. Historically, lawmakers' and regulators' concerns over interference between licensed services have led to policies that have effectively turned spectrum into a scarce resource; where acquiring additional licensed spectrum to meet increasing demand becomes a zero sum game. Setting aside legitimate national security issues, for those entities that have licensed spectrum but are concerned that it might be reallocated if not efficiently utilized, there is little incentive for licensees to be forthcoming regarding the details of their spectrum usage – locations, times, intensity. Scarcity encourages some licensees to make inefficient use of their licensed spectrum or warehouse it -- so that they have it in case they have a need for it in the future.

¹ Katz, R. "Assessment of the Economic Value of Unlicensed Spectrum in the United States", February 2014

Microsoft believes that making more efficient use of existing spectrum should be one of the key themes as the Committee looks to update U.S. spectrum policy. Improving efficient spectrum use starts with increasing the availability of information on existing spectrum utilization to help inform policy discussions and decisions involving various forms of spectrum management – ranging from reallocation of spectrum for exclusive use licensing or unlicensed access to dynamic access to allocated but unassigned spectrum. A persistent blind spot for Congress has been information on federal spectrum usage. Microsoft believes NTIA's recently announced Spectrum.gov website, which is intended to provide greater transparency regarding how federal government agencies utilize spectrum, should prove to be a valuable resource as Congress seeks to update our nation's spectrum policy.

Microsoft recognizes that there are significant ongoing efforts to increase data rates and improve spectrum efficiency. Most of this is attributable to private sector technology advancements and investments; the evolution of network architectures; and willingness of wireless carriers, cable companies, and others to look at things differently in order to meet their customers' seemingly insatiable demand for more bandwidth wherever they are.

For example, over the past few years, wireless carriers have begun deploying small cells leading to greater frequency reuse, have made extensive use of WiFi offloading, and begun employing smart antennas. Cable providers have aggressively built out WiFi networks whose reach will be extended even further as a result of the FCC recent 5.0 GHz order. Technologies such as carrier aggregation, which will enable multiple LTE channels to be used together to provide higher data rates is getting ready for widespread deployment. And just over the horizon are even more spectrally efficient technologies such as Simultaneous Transmit And Receive (STAR) over a single channel.

Advances in technology allow the Committee to explore certain policy options that could not be even considered a decade ago. Communications technologies are much more interference tolerant. Databases and other software intelligence developed for the operation of fixed and personal portable devices in the TV White Spaces demonstrate that spectrum can be shared successfully.

Perhaps the single most effective action that Congress could take to maximize efficient spectrum utilization in the U.S. would be to encourage the dynamic sharing of spectrum – between different licensed services, between licensed and unlicensed services, and between federal, state, and privately licensed services. The 2012 report by the President's Counsel of Advisors on Science and Technology (PCAST) entitled 'Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth' envisions a shared-use spectrum superhighway between 2.7 to 3.7 GHz. It is a good concept, but there is much policy development that needs to happen to make it workable. The issue of how to address incumbent Department of Defense licensees is a recurring theme. Critically, dynamic spectrum sharing must be implemented with market forces in mind. Thus, as spectrum bands are opened for dynamic spectrum sharing, both lawmakers and regulators must create a national footprint (e.g.

sufficient amount of available spectrum in every geographic market) in order to incentivize chip and device manufactures to make the necessary investments. Spectrum lying fallow does not serve the public interest and promoting effective means for dynamic spectrum sharing can minimize unused spectrum.

Similarly, auctioned or reallocated licensed spectrum not being used doesn't serve the public interest. Microsoft strongly supports the concept of 'use-it-or-share-it' where unlicensed devices can operate in location where spectrum has been commercially licensed but not yet put into operation. Use-it-or-share-it would discourage spectrum warehousing and encourage timely build-out of the spectrum beyond the current FCC requirements. Microsoft also supports the idea of facilitating further development of secondary markets for making more efficient use of spectrum.

Finally, much has been made of the need to improve receiver performance as a means to improve spectrum efficiency. Microsoft agrees that actions do need to be taken, but at this time does not advocate for any sort of receiver standards for non-federal equipment. There have been some interesting ideas presented at a recent panel sponsored by The Hamilton Project² and by the FCC Technology Advisory Committee that warrant further consideration³.

Microsoft thanks the Committee for the opportunity to provide this response to the Committee's White Paper, and it looks forward to ongoing discussion concerning the modernization of U.S. spectrum policy. For questions or additional information, please contact Paula Boyd, Director, Government and Regulatory Affairs at Paula.Boyd@microsoft.com or 202-263-5946 or John Sampson, Director Government Affairs at jsampson@microsoft.com or 202-263-5913.

² de Vries, J.P., Weiser, P. "Unlocking Spectrum Value through Improved Allocation, Assignment, and Adjudication of Spectrum Rights", The Hamilton Project, March 2014

³ Interference Limits Policy and Harm Claim Thresholds: An Introduction Spectrum / Receiver Performance Working Group, FCC Technological Advisory Council, Version 1.0 (March 5, 2014)



MODERNIZING U.S. SPECTRUM POLICY TO FULFILL COMPETITION AND DIVERSITY GOALS

The Minority Media and Telecommunications Council (MMTC)¹ urges Congress to provide greater oversight of the Commission's implementation of statutory directives designed to promote diverse ownership of spectrum assets as Congress examines the effective modernization of U.S. spectrum policy. As it stands, America is not poised to meet the needs of a changing population that is reshaping our society.

The White Paper requests feedback on how the Federal Communications Commission ("FCC") should address competition and spectrum aggregation at a time when demand threatens to eclipse the available spectrum supply.² As Congress strives to create a balanced spectrum policy that encourages competition and innovation in licensed and unlicensed services, Congress should consider how the FCC uses the tools already at its disposal. The FCC has several tools available to increase competition and the diverse distribution of spectrum licenses including set asides and bidding credits for small, minority, and women-owned businesses. However, over the years these tools were carelessly deployed in a manner that actually made it more difficult for these businesses to participate in spectrum auctions.³ As MMTC explained in its response to the

¹ MMTC is a non-partisan, non-profit, and market-oriented advocacy organization that seeks to preserve and expand minority ownership and equal opportunity in the media and telecommunications industries, and to close the digital divide. Since 1986, MMTC has advocated before the Federal Communications Commission (FCC) on behalf of the interests of minority business enterprises and communities of color. MMTC works with key stakeholders in public, private, and community sectors, blending public policy reform and social justice advocacy to ensure that communications policy reflects the nuanced issues of 21st century civil rights.

² See White Paper on Modernizing U.S. Spectrum Policy, Energy and Commerce Committee (April 2, 2014), p. 4 available at <http://energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/analysis/CommActUpdate/20140401WhitePaper-Spectrum.pdf> (last visited April 14, 2014).

³ See e.g. *Council Tree Communications, Inc. et al. v. FCC*, 619 F.3d 235 (3d Cir. 2010).

Committee's first White Paper,⁴ diverse business have long struggled to gain entry into FCC regulated industries due to "discrimination in the capital markets, in communities, in the advertising industry, and in the competitive marketplace; by the effects of deregulation and market consolidation precipitated by the 1996 Act; and by various actions and inaction on the part of the FCC, the Courts, and Congress."⁵

MMTC recently published a road map to increase minority ownership in wireless and, in particular, ownership of wireless licenses. The road map sets forth the impetus behind the Congressional directive to promote diversity in competitive bidding.⁶ Congress created Section 309(j) to help ensure that small businesses, rural telephone companies, and businesses owned by members of minority groups and women, collectively known as designated entities (DEs), were not priced out of spectrum auctions dominated by large communications companies.⁷ The FCC also worried about auctions creating additional barriers for small, minority, and women-owned businesses.⁸ Thus, during its inaugural years with auction authority, the FCC implemented a variety of tools to promote DE participation with great success.⁹

⁴ See Modernizing the Communications Act to Promote Equal Opportunity and Minority Ownership in the Media, Telecom and Internet Industries, MMTC (Feb. 4, 2014), available at http://mmtconline.org/wp-content/uploads/2014/02/MMTC-Submission-of-Comments_TelecomAct_2.4.14.pdf (last visited April 24, 2014).

⁵ *Whose Spectrum is it Anyway? Historical Study of Market Entry Barriers, Discrimination and Changes in Broadcast and Wireless Licensing 1950 to Present*, Ivy Planning Group, LLC (2000), p. 17, available at http://transition.fcc.gov/opportunity/meb_study/historical_study.pdf (last visited April 14, 2014).

⁶ See S. Jenell Trigg and Jeneba Jalloh Ghatt, *Digital Déjà Vu: A Road Map for Promoting Minority Ownership in the Wireless Industry* (Feb. 25, 2014), p. 1-3, 6- 12 ("MMTC White Paper") (attached in Appendix A). See also Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66 §6002 (granting the FCC the authority to use competitive bidding).

⁷ See MMTC White Paper at 2. Congress noted its concern that "unless the Commission [was] sensitive to the need to maintain opportunities for small businesses, competitive bidding could result in a significant increase in concentration in the telecommunications industries." *Id* (quoting H.R. Rep. No. 103-111, at 254 (1993)).

⁸ See MMTC White Paper at 2.

⁹ See *id*.

Access to capital is a long recognized barrier for DEs and, in particular, minority and women-owned businesses, throughout the communications industry.¹⁰ The ability of DEs to gain access to financing depends, in large part, on a stable regulatory environment:

The often times capital-intensive nature of communications businesses and the difficulties experienced by Entrepreneurial Companies in accessing capital make it virtually impossible for Entrepreneurial Companies to secure valuable spectrum licenses when bidding against well-capitalized incumbents; Entrepreneurial Companies will be successful in raising the capital needed to acquire and build out valuable spectrum licenses only if the capital markets perceive that the FCC's Designated Entity eligibility rules will remain stable and certain....¹¹

During the FCC's first decade conducting auctions, DE incentives encouraged more than 1,400 small businesses and minority-owned businesses to compete – and win – in the auction process.¹² DE participation was greater than 70% in six commercial mobile radio service spectrum auctions between 1996 and 2005.¹³ The majority of DEs that currently have wireless licenses are incumbent rural telephone companies; there are few new entrants and even less minority-owned businesses.¹⁴ Consequently, FCC actions have caused DE participation to plummet.

Just days prior to the AWS Auction 66 short-form application deadline in 2006, the FCC implemented significant changes to the DE eligibility rules that stymied Congress' mandate under 309(j) to license spectrum to promote competition and economic opportunity among a

¹⁰ See *e.g.* Implementation of Section 309(j) of the Communications Act – Competitive Bidding, Fifth Report and Order, 9 FCC Red 5532, 5537 ¶10-11 (1994).

¹¹ See Diversity Committee Draft Resolution Supporting Retention of Designated Entity Rules (October 4, 2004), available at <http://transition.fcc.gov/DiversityFAC/recommendations.html> (follow link to “Designated Entity Rules Draft”) (last visited April 9, 2014).

¹² See *id.* MMTC White Paper at 3. “In Auction 5, PCS C Block, 89 entrepreneurs acquired 493 licenses; [i]n Auction 10, PCS C Block re-auction, 7 small businesses acquired 18 licenses; [i]n Auction 11, PCS D, E, and F Blocks, 93 small businesses won 598 licenses; [i]n Auction 14, WCS, 8 small businesses acquired 32 licenses; and [i]n Auction 22, PCS, 48 small businesses acquired 277 licenses.” *Id.* at 8.

¹³ See *id.*

¹⁴ See MMTC White Paper at iv, 3.

variety of diverse applicants.¹⁵ The 2006 rule changes created an attributable material relationship (AMR) rule, which limits the ability of a DE to lease, wholesale, and resale more than 25% of its spectrum capacity to one entity; an impermissible relationship rule, which denied DE status to any entity that leased or resold more than 50% of the aggregate amount of spectrum won at auction; and the unjust enrichment rule, which increased the unjust enrichment period from five to ten years.¹⁶ The court eventually vacated two of the three rule changes as arbitrary and capricious due to serious deficiencies in the notice and comment process.¹⁷ Unfortunately, the damage had already been done.

The 2006 rule changes created regulatory uncertainty and increased barriers to accessing capital, drastically reduced DE participation from an average of 70% prior to the rule changes to 4.0% in Auction 66 and 2.6% in Auction 73.¹⁸ Yet while DE participation dropped, AT&T and Verizon Wireless flourished, winning 84.4% of the total value of spectrum in Auction 73.¹⁹ Just as Congress feared, diverse competitors have been priced out of competitive bidding process. Today, the FCC's missteps and the AMR rule – the last vestige of the 2006 rule change, continue to preclude meaningful DE participation in spectrum auctions.

As the nation's demographics continue to transition into a majority-minority population, excluding DEs, especially minority-owned businesses, is simply bad economic policy. Minority-owned businesses add significant value to our economy by promoting local economic development and investing in underserved communities.²⁰ Moreover, wireless service has

¹⁵ See 47 U.S.C. §309(j)(3)(B).

¹⁶ See MMTC White Paper at 13.

¹⁷ See *Council Tree Communications, Inc. et al. v. FCC*, 619 F.3d 235, 258 (3d Cir. 2010).

¹⁸ See MMTC White Paper at 14.

¹⁹ See *id.* at 15.

²⁰ See *id.* at 23.

provided an onramp to broadband for people of color, low-income, and rural populations that disproportionately rely on cell phones and mobile devices for Internet access.²¹ The high level of wireless service consumption by diverse communities suggests an opportunity for increased diverse ownership in this industry. Excluding diverse companies and stifling new entrants, along with other discriminatory practices, can have a real and significant economic cost, amounting to billions of dollars.²² Failing to recognize the role of small, minority, and women-owned businesses as viable competitors in these new markets can also impact the nation's ability to generate new employment and economic development opportunities within minority and rural communities.

Congress should ensure that our national spectrum policy provides meaningful opportunities for minority-owned business participation in its licensing process – regardless of the form in which spectrum policy is carried out – e.g. through competitive bidding or secondary market transactions. Given a stable regulatory climate that presents low entry barriers, minority-owned businesses are able to put together business plans that raise sufficient capital to enter the market.²³ For example, Grain Capital's closing of the largest minority spectrum acquisition, valued at \$287 million, with AT&T and Verizon Wireless illustrates the potential for successful MBE engagement.²⁴ However, due to the last remaining 2006 rule change, the AMR rule, that

²¹ See *id.* at 4.

²² See *id.* at 24. "Economist Andrew F. Brimmer, calculated the cost that racial discrimination placed on our economy in billions of dollars – and that was 20 years ago. For example, the failure to fully utilize the existing skills of African Americans and the failure to improve education for African Americans costs the U.S. billions of dollars in societal growth. As a result, racial discrimination cost our nation approximately 3.8% of our GDP or \$241 billion in 1993." *Id.* (citing Andrew F. Brimmer, *The Economic Cost of Discrimination Against Black Americans*, in *Economic Perspectives on Affirmative Action*, Joint Center for Political and Economic Studies (Margaret C. Simms ed., 1995)).

²³ See *id.* at 26.

²⁴ See *id.*

same company, may now have trouble participating as a DE in the upcoming spectrum auctions.²⁵

Thus, as Congress examines how to modernize U.S. spectrum policy we urge greater oversight over the implementation of the goals and directives designed to promote diverse ownership of spectrum assets. Congress should provide the FCC with directions to increase bidding credits, eliminate the AMR rule, and collect data on DE participation to continuously examine barriers to DE participation.²⁶ Congress should also examine additional ways to facilitate greater DE access to capital, for example, through a reinvigorated Telecommunications Development Fund.²⁷ Acting upon these recommendations as part of the Telecom Act update can have a significant impact on deepening competition in upcoming spectrum auctions.

Respectfully submitted,

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²⁵ See e.g. Grain Management, LLC's Request for Clarification or Waiver of the Commission's "Attributable Material Relationship" Rule, WT Docket No. 05-211 *et al.* (March 4, 2014).

²⁶ See MMTC White Paper at 31-35 (MMTC submitted nine policy recommendations to advance minority spectrum ownership, each of which are described in the attached MMTC White Paper in greater detail).

²⁷ See *id.* at 34.

Appendix A



**Digital Déjà Vu: A Road Map for Promoting
Minority Ownership in the Wireless Industry**

**S. Jenell Trigg, Esq'
Jeneba Jalloh Ghatt, Esq.**

February 25, 2014

Acknowledgements: The authors acknowledge and appreciate the many suggestions and support offered by David Honig, Dr. Nicol Turner-Lee, Maurita Coley, Jacqueline Clary, DeVan Hankerson, and Joycelyn James.

Table of Contents

| | |
|--|-----------|
| Dedication & Tributes to Herbert P. Wilkins, Sr. | i |
| Executive Summary | iv |
| Digital Déjà Vu: A Road Map for Promoting Minority Ownership in the Wireless Industry | 1 |
| I. Introduction | 1 |
| II. The Declining Trajectory of MBE Participation in Spectrum Auctions, 1996 to the Present..... | 6 |
| III. The FCC Adopted Rule Changes that Hampered New Entrant DE Participation..... | 12 |
| IV. <i>Adarand</i> and DE Program Administration | 18 |
| V. The FCC’s Failed DE Program Undermines MBEs, Communities and Competition | 21 |
| 1. MBEs Contribute Significantly to the National Economy and Promote Local Economic Development. | 23 |
| 2. Continued Discriminatory Practices Have an Economic Cost. | 24 |
| 3. MBEs Can Contribute to Workforce Development Opportunities for Women and Other Minorities.... | 25 |
| VI. The Importance of Secondary Market Transactions to MBE Participation | 26 |
| VII. Nine Policy Recommendations to Advance Minority Spectrum Ownership..... | 31 |
| 1. Eliminate the <i>Attributable Material Relationship Rule</i> | 32 |
| 2. Increase bidding credits to at least 40%. | 32 |
| 3. Reinstitute select DE-only closed spectrum auctions. | 33 |
| 4. Incorporate diversity and inclusion in the Commission’s public interest analysis of mergers and acquisitions (“M&As”) and secondary market spectrum transactions..... | 33 |
| 5. Conduct ongoing recordkeeping of DE performance. | 33 |
| 6. Complete the <i>Adarand</i> Studies, updating the Section 257 studies released in 2000. | 33 |
| 7. Regularize procedural requirements. | 33 |
| 8. Conduct a substantive review of proposed DE rules. | 33 |
| 9. Support increased funding for & statutory amendments regarding the Telecommunications Development Fund. | 34 |
| VIII. Conclusion | 35 |



Dedication & Tributes to Herbert P. Wilkins, Sr.

This paper is dedicated to the memory of

Herbert P. Wilkins, Sr.

Longtime MMTC Board Member and Benefactor, Minority Venture Capital Icon, Mentor, and Champion for Diversity of Ownership in the Media and Telecommunications Industries

January 9, 1942 - December 3, 2013

Herbert P. Wilkins, Sr., renowned venture capitalist and entrepreneur, will best be remembered for his stalwart leadership and achievements on behalf of minority entrepreneurs in the broadcast, cable, wireless and satellite industries. Affectionately known as the “Godfather of Minority Venture Capital,” Herb’s strong belief in the potential of minority businessmen and women motivated him to take risks that many others feared to take, leaving behind a legacy of success in minority-owned businesses in the communications industries. Herb revolutionized minority entrepreneurship in the broadcasting, cable, telecom and wireless industries through his successful venture capital funds, Syndicated Communications, Inc., and Syncom Venture Partners, funds that, collectively, have invested nearly a half-billion dollars in approximately 150 minority-owned communications business enterprises over the past 35 years. With a mission to diversify the ownership of media and telecom in the United States, Herb, along with his long-time partners Terry Jones, Duane McKnight and the Syncom team, adopted a winning approach by investing in deals other venture capital firms refused, and sharing the risks and rewards of their investments with other minority venture capitalists through syndication-style investments. The Syncom Funds not only made financial investments in minority entrepreneurs, but they also incubated them to help to ensure their success.

Consistent with that vision, Syncom advised and invested in major industry icons and brands that include Bob Johnson of BET Holdings, Inc. and District Cablevision; Cathy Hughes and Alfred Liggins of Radio One and TV One; Moctesuma Esparza of Buena Vista Television and Maya Cinemas; Tom Castro of El Dorado Communications; Simplink Corporation; SiTV; Amador Bustos of Z-Spanish Media Corp, and made investments in two wireless companies, Movistar (Puerto Rico) and PrimeCo Wireless Communications LLC (Chicago). Herb served on the boards of many of the companies in which Syncom invested. Notably, he served, along with cable television industry pioneer John Malone, on the board of directors of BET Holdings, Inc., helping to advise his friend and business partner Bob Johnson, who later became the first African American billionaire when BET was sold to Viacom. Herb, Bob Johnson, and former FCC Commissioner Tyrone Brown were the braintrust for BET’s future investments and would help to spawn initiatives to increase minority ownership, including the FCC tax certificate. And prior to becoming FCC Chairman, William E. Kennard was hand-selected by Herb to serve as Syncom’s primary outside counsel for a number of years. Herb’s numerous investments culminated in the acquisition of the \$6 billion Iridium Satellite Corporation as part of a team of private investors who purchased Iridium from Motorola out of bankruptcy for \$25 million, then led Iridium to a turnaround success.

Herb credited his family with his strong work ethic and entrepreneurial vision; notably, his aunt, his mother, and his father who was a master painter. Herb attended HBCU Central State University, then transferred to Boston University and graduated in 1965 with a B.A. in History. In 1968, Herb married his soulmate, Sheran, whom he often credited for his focus and success in life and business. Herb graduated from Harvard School of Business in 1970; the rest is history.

As the journey for the attainment of minority ownership continues, this paper is dedicated to Herbert P. Wilkins, Sr., a trailblazer for minority enterprise in the media and telecommunications industries, and a friend and motivator for MMTC as we advocate for equal opportunity in the communications industries.

TRIBUTES TO HERBERT P. WILKINS, SR.

Herbert P. Wilkins, Sr.'s life touched the lives of so many people, including the authors of this White Paper. Below, we have captured the tributes of several of his friends, mentees, and business associates. These few tributes reflect the thoughts and feelings of many others whose words could not be included.

“At a minimum, Herb’s life is a movement that parallels the momentous rise of minority ownership of the media and telecommunications industries, and his faith in the dreams of others. The best way we can honor Herb is to continue his work of promoting minority participation in the 21st century technologies.” *Maurita Coley, Vice President and Chief Operating Officer, MMTC*

“Herb’s life epitomizes the impact that minority enterprise, when supported, celebrated, and financed, can have on a people. Herb never went into the night quietly. He would speak the truth, no holds barred. Whenever he had the podium at MMTC, he would do something no one else in the financial world could do – deliver a fiery stemwinder of an address on the urgency of establishing large minority businesses – institutions that would circulate dollars in the minority community and build real wealth. Herb’s oratorical passion was so profound that if you closed your eyes you would think Malcolm X were standing before you, reincarnated.” *David Honig, Co-founder and President, MMTC*

“Alfred and I are in existence today because of who I used to affectionately refer to as the ‘godfather’ of the broadcast industry. Herb and his partner, Terry Jones, put together our first million dollar package. If they had not believed in us, we would not be where we are today. Herb was the gatekeeper for Black entrepreneurs in the broadcast industry. He was so dedicated to opening that door wider and wider, single-handedly opening doors of entry to minority broadcast owners. Herb was a patient and firm lender, but he was so nurturing, in the way they helped us to grow. When I could not make my payments to Syncom, I pled with him to be patient with me, and I promised that I would be the largest and most successful company in his portfolio. God has blessed me to make good on that promise.” *Cathy Hughes, Co-founder, Radio One, TV One, Interactive One*

“Working with Herb for 30+ years, I can tell you unequivocally that he was a powerful and passionate force in the fight to provide capital and economic opportunity to underserved entrepreneurs throughout America, especial Blacks and Latinos. The impact of his contributions is being felt today, and will live far into the future. We are all dedicated to carry on his work...” *Terry Jones, Managing Partner, Syncom Venture Partners*

“When I first met Herb, I met ‘Herb the Icon.’ I was a young lawyer trying to break into the media business, and he was already considered an icon in both the business and venture capital worlds because of his tremendous success. When our paths crossed again, I was privileged to get to know him as ‘Herb the Businessman.’ I began working at BET in 1986, and Herb was a board member and close friend and advisor to Bob Johnson. I quickly learned two things about Herb: he had an opinion, and he wasn’t afraid to share it. I also learned that he truly took delight in investing in minority media companies and in helping them to prosper and deliver value to their shareholders....Time revealed that beneath his tough exterior was a surprisingly soft side. Herb was a big teddy bear, and for many of us he became ‘Herb the Friend.’ While he invested in our businesses financially, he invested in us personally. He mentored me, and so many other professionals, because he cared about us as individuals and wanted to see us succeed. As I worked with Herb over the years, I came to recognize him more and more as ‘Herb the Visionary.’ His influence in the Black and Hispanic media landscape is unmatched. He is in large measure responsible for the success of BET Networks and Radio One – two of the largest brands in the media space. I consider myself

fortunate to have known Herb and to have benefited from his no-nonsense approach to business. Herb was an industry icon, an extraordinary businessman, a true visionary, and a wise mentor. His influence and calculated investments in the media space will be felt long into the future. For so many, his friendship and guidance will be missed.” **Debra L. Lee, President and CEO, BET Networks**

“Mr. Wilkins will long be remembered for his consistent and deep commitment to minority entrepreneurs seeking to realize their dreams of serving communities of color and the nation. His strong belief in the unrealized potential of minority business motivated him to take risks that many others feared to take. He epitomized the maxim ‘doing well by doing good,’ and we are all enriched by the opportunities he helped to create. We are forever grateful for Mr. Wilkins’ generous spirit and sage counsel.” **Maureen Lewis, Director of Minority Telecommunications Development, National Telecommunications & Information Administration, U.S. Dept. of Commerce**

“Herb was a great friend and supporter of Bob [Johnson, Founder of BET], myself, and BET. His sense of humor and sound advice were critical in developing the first minority-owned cable network. He will be missed.” **John C. Malone, Chairman, Liberty Media**

“Herb was one of the most brilliant strategic thinkers that I ever had the pleasure of working with. He was as tough and cutting edge as they come, but strongly believed in winning the right way, and always with impeccable integrity. Herb was equally passionate about his mission of creating wealth in the minority community through business ownership and growth. He felt this could only be accomplished by bringing meaningful capital access and guidance to entrepreneurs of color to develop high growth businesses for an eventual capital gain exit event to stakeholders. These successful companies would in turn provide top executive opportunities for minority managers who in time would become the seasoned business owners of tomorrow, thus repeating and growing the ecosystem. The success of Syncom in doing its part over the last 35 years to achieve that mission is the legacy of Herb Wilkins, Sr....He will be missed.” **Duane C. McKnight, Senior Partner, Syncom Venture Partners**

“Herb Wilkins was one of the great financial geniuses of our time. Herb had the foresight to know where business opportunities existed and the expertise to help entrepreneurs succeed with those opportunities. His string of helping to develop BET, Radio One, and numerous other startup companies into major thriving businesses is unequalled. Herb spoke at numerous NABOB conferences, where he demonstrated his commitment to making African American businesses better and stronger. His dedication to that goal benefited all of us who had the opportunity to work with him and to learn from him.” **James L. Winston, Executive Director, National Association of Black Owned Broadcasters (NABOB)**

A Big Man

A BIG MAN,
OF HIS TIMES,
HE MADE HIS TIMES;
INDELIBLE HIS TOUCH
HIS ENDOWMENT ONLY CLIMBS,

A SPIRIT,
A FORCE,
ENTREPRENEUR BY NATURE,
NATURE KNEW NO MATCH,
LEGIONS ARE HIS SOURCE,

HERB,
MEMORY WILL NOT FAIL,
YOU ARE NOT GONE,
BUT BRINGING HELL
TO HEAVEN;
BLAZING SOME NEW TRAIL.

Additional tributes by BET Deputy General Counsel Lawrence Cooper; Hogan Lovells Partner Ari Fitzgerald; Greystone Partners Managing Partner Kenneth O. Harris; Radio One, TV One, and Interactive One Co-founder Alfred Liggins; and former Broadcast Capital Fund President John Oxendine are available online at mmtconline.org and bbsj.org.

Frank Washington, Entrepreneur and Attorney

Digital Déjà Vu: A Road Map for Promoting Minority Ownership in the Wireless Industry

S. Jenell Trigg, Esq.[‡]
Jeneba Jalloh Ghatt, Esq.[†]

Executive Summary

With incentive auctions projected to generate billions in revenue in the near future, the inclusion of MBEs in the communications sector – as licensees and ultimately as facilities-based spectrum owners – is vital to fulfilling the promise of innovation, competition, universal deployment, and other advanced wireless services that are transforming the nation. As the wireless industry continues to be an essential element of the nation’s economic growth, the aspiration to own and operate the assets that enable and empower this industry holds profound importance to minority-owned business enterprises (“MBEs”), and the people and communities they represent.

When Congress first authorized the Federal Communications Commission (“FCC” or “Commission”) to allocate scarce public radiofrequency spectrum via competitive bidding (auctions) in Section 309(j) of the Communications Act in 1993, they mandated that the agency promote the participation of small, MBE and women-owned business enterprises (“WBEs”) and rural telephone companies (collectively known as “Designated Entities” or “DEs”), avoid excessive concentration of licenses, and disseminate licenses among a wide variety of applicants.

Despite the statutory mandate to promote MBE and WBE participation in spectrum auctions, however, the FCC’s Designated Entity (“DE”) Program has been largely ineffective. Over the course of fifty-six wireless auctions during the past 20 years, the majority of DEs that currently hold wireless licenses are incumbent rural telephone companies, very few DEs are new entrants, and even fewer DEs are MBEs. Without a change in policy and current rules and regulations, the outlook for expanded minority participation remains dismal.

This paper explores the history and obstacles that have hampered MBE (and WBE) inclusion as wireless spectrum licensees, and presents the following *nine* public policy recommendations to assist the FCC in facilitating measureable improvement in DE participation in upcoming auctions.

[‡] S. Jenell Trigg is Chair of Lerman Senter PLLC’s Intellectual Property and New Media and Technology Practice Group. She is the former Assistant Chief Counsel for Telecommunications, Office of Advocacy, U.S. Small Business Administration. She was also a law clerk to Commissioners Rachelle B. Chong and Susan Ness, and later a senior Telecommunications Policy Analyst in the FCC’s Office of Communications Business Opportunities.

[†] Jeneba Jalloh Ghatt is Managing Partner at The Ghatt Law Group LLC, a small, minority and women-owned broadcast, wireless, tech law firm. She was Associate General Counsel at the District of Columbia’s Office of Cable Television and Telecommunications. She represented public interest organizations on matters before the FCC while a Staff Attorney at The Georgetown University Law Center’s Institute for Public Representation before representing telecommunications clients at the law firm Willkie Farr & Gallagher. She has also taught Media Law at the University of Maryland at College Park.

1. Eliminate the *Attributable Material Relationship Rule*. DEs should be able to retain their DE status, including the value of bidding credits, without having to attribute the revenues of other firms (large or small) if they enter into leasing, wholesaling, and/or resale arrangements for more than 25% of spectrum capacity to one entity.
2. Increase bidding credits to at least 40%. An increase would help compensate for the harms caused by the 2006 DE Rules and counterbalance concentrated license ownership.
3. Reinstitute select DE-only closed spectrum auctions. Doing so would level the playing field for DEs against large incumbents and well-financed new market entrants.
4. Incorporate diversity and inclusion in the Commission's public interest analysis of mergers and acquisitions ("M&As") and secondary market spectrum transactions. Such analysis would ensure that there are compelling factors in the determination of whether any transaction meets the public interest standard, including MBE and WBE participation. Such documentation should also be a part of the agency's annual Wireless Competition Report to Congress.
5. Conduct ongoing recordkeeping of DE performance. The Commission should retain specific information about the MBE and WBE status of bidders, in addition to the small business status, to accurately measure auction outcomes.
6. Complete the *Adarand* Studies, updating the Section 257 studies released in 2000. These studies should specifically detail market failures as defined by Section 257, and should include a comprehensive review of the successes or failures of the DE program as well as race-neutral measures to implement Section 309(j) since its inception.
7. Regularize procedural requirements. Such action would ensure that future regulatory and policy changes are conducted with ample time for public notice and comment, with outreach to all types of DEs to ascertain the real-world impact of such changes.
8. Conduct a substantive review of proposed DE rules. Such review would include an analysis of potential market entry barriers and of significant economic impacts on DEs for auction rules at the NPRM stage of the rulemaking process.
9. Support increased funding for and statutory amendments regarding the Telecommunications Development Fund. Reinvigoration and reactivation of TDF can help support today's DEs, especially MBEs and WBEs, by providing financing consultation for auction participants, and support for and/or partnership with producing the FCC's *Adarand* studies required to meet constitutional strict scrutiny requirements.

This paper proposes recommendations #1, #2 and #4 as the highest priorities to ensure that MBEs are included in wireless spectrum ownership expeditiously.

Due to marketplace dynamics, long-standing market entry barriers and discriminatory practices, compounded by regulatory and legal impediments, MBE ownership of full power radio and TV stations is at its lowest in decades, and the number of MBE-owned cable systems is negligible, at best. Adopting the recommendations in this paper will help ensure that the FCC does not continue to contribute to a similarly discouraging outcome in the wireless industry.

Digital Déjà Vu: A Road Map for Promoting Minority Ownership in the Wireless Industry

S. Jenell Trigg, Esq. and
Jeneba Jalloh Ghatt, Esq.

I. Introduction

“[B]roadband is a foundation for economic growth, job creation, global competitiveness and a better way of life. It is enabling entire new industries and unlocking vast new possibilities for existing ones. It is changing how we educate children, deliver health care, manage energy, ensure public safety, engage government, and access, organize and disseminate knowledge.”¹

When Congress first created the Federal Communications Commission (“FCC” or “Commission”) to regulate the nation’s radiofrequency spectrum nearly 80 years ago, lawmakers recognized that the public had an ownership interest in the airwaves. When it created the FCC, Congress therefore required that it serve the public interest, convenience, and necessity in its duties and in allocation of this scarce public resource.²

In 1993, Congress amended the Communications Act to grant the FCC authority to conduct competitive bidding (auctions) as a more efficient and expedient means to allocate new licenses.³ Congress also recognized that small businesses, rural telephone companies, and businesses owned by members of minority groups and women (collectively, “Designated Entities” or “DEs”) faced longstanding market entry barriers such as access to capital due to discriminatory practices in equity and debt markets.⁴ Therefore, Section 309(j) of the amended Communications Act required the FCC to

¹ FCC, *Connecting America: The National Broadband Plan*, rel. Mar. 16, 2000, at Executive Summary p. xi.

² 47 U.S.C. §§151 and 309(a). These sections of the Communications Act of 1934, as amended (the “Communications Act”) provide a foundation for all FCC rules and policy.

³ See Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, §6002 (codified at 47 U.S.C. §309(j)).

⁴ *Section 257 Proceeding to Identify and Eliminate Market Entry Barriers for Small Business*, Report, 12 FCC Rcd 16802, 16824-46 ¶¶35-81 (1997); see also *Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, Fifth Report and Order, 9 FCC Rcd 5532, 5537-38 ¶11 (1994) (“*Fifth R&O*”).

“promot[e] economic opportunity and competition and ensur[e] that new and innovative technologies are readily accessible to the American people by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants, including small businesses, rural telephone companies, *and businesses owned by members of minority groups and women.*”⁵

Congress created these provisions out of the concern that DEs could easily be priced out of auctions because they would have to compete directly with incumbents that were often large, well capitalized, entrenched and experienced communications companies. At that time, Congress asserted that “unless the Commission [was] sensitive to the need to maintain opportunities for small businesses, competitive bidding could result in a significant increase in concentration in the telecommunications industries.”⁶

The FCC shared this concern, and adopted regulations to create auction rules, noting that “although auctions have many beneficial aspects, they threaten to erect another barrier to participation by small businesses and businesses owned by minorities and women by raising the cost of entry into spectrum-based services.”⁷ The Commission also recognized that the “primary impediment to [auction] participation by designated entities”⁸ was their inability to secure and retain access to capital to participate. When Congress amended Section 309(j) years later, it specifically required the Commission to analyze the impact of certain changes on “the ability of small businesses and new entrants to participate effectively in the bidding process.”⁹

The FCC started off the first decade of its auction authority by implementing a variety of congressionally-approved tools and regulatory initiatives to promote participation by minority-owned

⁵ 47 U.S.C. §309(j)(3)(B) (emphasis added).

⁶ H.R. REP. NO. 103-111, at 254 (1993).

⁷ *Fifth R&O* at 5537 ¶10.

⁸ *Id.*

⁹ Balanced Budget Act of 1997, H.R. REP. NO. 105-217, at 572 (1997).

business enterprises (“MBEs”), such as tax certificates, installment payment plans and special closed auctions for DEs only. Over a ten-year span, more than 1,400 small businesses, including MBEs, won spectrum licenses as a result of the competitive bidding process. In recent years, however, the FCC’s DE program has become ineffective following the agency’s gradual repeal and elimination of previously existing incentives to encourage MBE participation, legal impediments, the further expansion of large incumbents, the elimination of rules and policies that limited the amount of spectrum licensed to one entity, and the impact of the FCC’s own regulatory missteps – well-intended or not.

Over the course of fifty-six wireless auctions during the past 20 years, the majority of DEs that currently hold wireless licenses are incumbent rural telephone companies, very few DEs are new entrants, and even fewer DEs are MBEs. Without a change in policy and current rules and regulations, the outlook for increased minority participation remains dismal. Moreover, the Commission’s weak track record on promoting diversity will continue to disadvantage MBEs.

This paper argues that the inclusion of MBEs in the wireless communications sector – as licensees and ultimately as facilities-based spectrum owners, not just service providers or mobile application developers – is vital to fulfilling the promise of innovation, competition, universal deployment, and other advanced wireless services that are transforming the nation. The value of the incentive auctions to the nation’s economy cannot be overstated as the auctions (along with other measures to enable more efficient spectrum management) could generate nearly \$28 billion in revenue over ten years.¹⁰ The FCC has also planned to auction additional advanced services spectrum in the near future, such as AWS-3 and 600 MHz spectrum blocks, raising the potential opportunities for new services and new entrants considerably.

¹⁰ See White House Report on the Economic Benefits of New Spectrum for Wireless Broadband at pp. 1-25.

Moreover, as the wireless industry continues to be an essential element of the nation's economic growth, the aspiration to own and operate the assets that enable and empower this leading industry holds profound importance to MBEs, and the people and communities they represent.

America needs to be poised to face an increasing shift to a majority-minority population – a massive demographic transition that is already starting to reshape our country.¹¹ Consequently, the recent shift in mobile broadband use by people of color should not be alarming. According to Pew, more people of color rely more heavily on their cell phones for Internet access. Among cell-mostly Internet users, 43% are Black, Non-Hispanic and 60% are Hispanic, while overall 34% of all users are cell-mostly Internet users.¹² Other demographic characteristics are that people in this group tend to be young (18-29 age group, less educated, (45% of cell Internet users have a high school diploma or less) and less affluent.¹³ Reports on mobile broadband use also show that more people of color use their cell/smartphones for broadband-enabled activities like application downloading. Sixty-percent of African Americans and 52% of Hispanic Americans fall into this category as compared to 50% of all cell phone owners.¹⁴ There is also a rising trend toward exclusive mobile device usage. The National Telecommunications Information Administration (“NTIA”) reports that 5% of Hispanic and African Americans are using the Internet on mobile devices only, as compared to only 3% of all Internet users.¹⁵

¹¹ See, e.g., William H. Frey, *Shift to a Majority-Minority Population in the U.S. Happening Faster than Expected*, Brookings (June 19, 2013), available at <http://www.brookings.edu/blogs/up-front/posts/2013/06/19-us-majority-minority-population-census-frey> (last visited Feb. 5, 2014).

¹² See Maeve Duggan and Aaron Smith, *Cell Internet Use 2013*, Pew Research Center (Sept. 16, 2013), p. 9, available at http://pewinternet.org/~media/Files/Reports/2013/PIP_CellInternetUse2013.pdf (last visited Feb. 14, 2014).

¹³ See *id.*

¹⁴ See Maeve Duggan, *Cell Phone Activities 2013*, PewResearchCenter (Sept. 16, 2013), p. 7, available at http://www.pewinternet.org/files/old-media/Files/Reports/2013/PIP_Cell%20Phone%20Activities%20May%202013.pdf (last visited Feb. 14, 2014).

¹⁵ See NTIA and ESA, *Exploring the Digital Nation: America's Emerging Online Experience*, U.S. Department of Commerce (June 2013), p. 19, available at http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_-_americas_emerging_online_experience.pdf (last visited Feb. 14, 2014).

Wireless-only household use is also increasing among communities of color. Compared to national wireless-only household use measured at 36%, Hispanics and African Americans are at 47% and 38% respectively.¹⁶

While the growth in mobile use among consumers of color is beginning to narrow disparities in access and use, the challenge of building significant spectrum ownership among members of under-represented groups still persists. In addition to being wireless consumers, it is vital for MBEs to have opportunities to be producers – by owning and controlling public infrastructure-related resources such as wireless licenses.

Section one of this paper demonstrates how the FCC's DE program, when supported and enforced, led to more robust MBE participation in spectrum auctions. The second section outlines how certain legal developments, in addition to rule and policy changes adopted by the FCC degraded the program's effectiveness, thus leading to fewer MBE licensees. The remainder of the paper proffers that investments in secondary market transactions and integration of diversity goals in public interest standards could serve to remedy the disparate representation by MBEs, with the paper concluding with *nine* immediate, practical policy recommendations to make possible meaningful levels of MBE participation in commercial wireless entrepreneurship.

¹⁶ See Stephen Blumberg and Julian Luke, Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, January-June 2012, National Center for Health Statistics (2012), pp. 1, 3, available <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201212.PDF> (last visited Feb. 14, 2014).

II. The Declining Trajectory of MBE Participation in Spectrum Auctions, 1996 to the Present

When the wireless industry was still in its infancy, MBEs had a unique opportunity to enter the industry on the ground floor, unlike MBEs engaged in terrestrial broadcasting.¹⁷ In some ways due to the creation of new communications services, the wireless industry avoided the history of discrimination present in the broadcasting industry that hampered the ability for new entrants, especially MBEs. Unfortunately, other forms of discrimination against MBEs regarding access to capital have carried through to the new industry.¹⁸

Congress enumerated various initiatives for the FCC to consider promoting the participation of DEs, such as “tax certificates, bidding preferences, and other procedures.”¹⁹ Congress also prohibited the

¹⁷ The first minority owned radio station signed on in 1949, and the first minority-owned TV station signed on in 1973 - well after many of the more valuable licenses had been allocated to non-minority entities due to discriminatory practices by state and federal governments, and policies that were favorable to non-minority owned newspapers and incumbents. See Antoinette Cook Bush and Marc S. Martin, *The FCC's Minority Ownership Policies from Broadcasting to PCS*, 48 Fed. Comm. L.J. 423, 424-439 (1996) (“Bush and Martin”). Today, MBE ownership levels of full power radio and TV stations are at their lowest in decades. See Jeffrey Layne Blevins, *The Death of Diversity in U.S. Broadcast Ownership*, City Beat (Jan. 15, 2014) (providing an overview of policies that led to the demise of MBE ownership). As of the final draft of this White Paper, there are only three African American-owned full power television stations. Oxford Media Group, Inc., licensee of WJYS in Hammond, Indiana, is majority owned by Joseph A. Stroud. See Application for Renewal of Broadcast Station License, File No. BRCDT-20130401ATZ (March 2011). Armstrong Williams, recently purchased two stations from the Sinclair Broadcast Group, Inc., WEYI-TV in Flint, Michigan and WWMB in Myrtle Beach, South Carolina, through his company Howard Stirk Holdings, LLC. See Naeem Mcfadden, *Williams finalizes ownership of television stations*, Star & Enterprise (Nov. 11, 2013) available at: http://www.scnw.com/starandenterprise/news/article_24b1f88e-4c6c-11e3-9b45-001a4bcf6878.html (last visited Feb 19, 2014).

¹⁸ One of the five (5) FCC-commissioned Section 257 studies released in December 2000 was “Discrimination in Capital Markets, Broadcast/Wireless Spectrum Service Providers and Auction Outcomes” by William D. Bradford, Ph.D., endowed Professor of Business and Economic Development and Professor of Finance, School of Business Administration, University of Washington, December 5, 2000. The *FCC Capital Market Discrimination Study* summarized that businesses owned by minorities and women face statistically significant differences in the likelihood of winning in spectrum auctions compared to other participants due to historical and continuing discrimination in private and institutional debt capital markets. *Id.* at ix. The Study’s results suggest that “without a remedy for capital market discrimination, minority- and women-owned business are inappropriately disadvantaged in obtaining FCC broadcast and wireless licenses.” *Id.* at 3. In 2004, the FCC reissued all of its Section 257 Studies for further public comment. See *Media Bureau Seeks Comment on Ways to Further Section 257 Mandate and to Build on Earlier Studies*, FCC Public Notice, 19 FCC Rcd 10491 (June 15, 2004). The FCC has not yet acted in this proceeding.

¹⁹ 47 U.S.C. §309(j)(4)(D).

FCC from taking into account potential auction revenue when crafting auction rules and procedures.²⁰ As a result, bidding credits have always been an essential part of the program.²¹ To fully implement Section 309(j) and “take the steps that are necessary to *ensure that designated entities have a realistic opportunity* to obtain [spectrum] licenses,”²² the FCC adopted several classifications of Designated Entities. These were defined as small and very small businesses, MBEs and WBEs, rural telephone companies,²³ and entrepreneurs.²⁴ To incentivize MBEs and WBEs and help compensate for historical discrimination in the capital markets, the FCC, on its own initiative, also provided additional bidding credits to MBEs and WBEs²⁵ and allowed the payment for licenses in installments over a longer period of time and at a lower interest rate.²⁶ These actions, in addition to FCC hosted DE-only auctions, served to mobilize DE participation and representation.²⁷

In its early years, the DE program had been very successful in introducing diverse new entrants as a result of the FCC’s favorable rules and policies. In the first 10 years of the FCC DE program, 1,435 firms meeting the FCC small business criteria, including MBEs, won licenses.²⁸ A summary of some of those successes are outlined below:

²⁰ See 47 U.S.C. §309(j)(7)(A).

²¹ Bidding credits are “a discount on the bid price a [DE] firm will actually have to pay to obtain a license and, thus, will address directly the financing obstacles encountered by these entities.” *Fifth R & O* at 5590 ¶132. “[T]he use of bidding credits in auctions would be an effective tool to ensure that women and minority-owned businesses have opportunities to participate in the provision of those services. *Id.* at 5589 ¶130.

²² *Fifth R&O* at 5537 ¶9 (emphasis added).

²³ 47 C.F.R. §1.2110.

²⁴ *Id.*

²⁵ See *Fifth R&O* at 5539 ¶15.

²⁶ See *id.* at 5539 ¶16.

²⁷ See *id.* at 5580 ¶113 (employing a range of methods to promote DE participation, including “closed” auctions for specific spectrum blocks, installment payment plans, tax certificates and reduced upfront payments). As Congress repealed the tax certificate in March 1995, three months prior to the Supreme Court’s decision in *Adarand Constructors, Inc. v. Peña*, it was never an effective incentive for MBE entry into wireless.

²⁸ See Gregory Rose and Mark Lloyd, *The Failure of FCC Spectrum Auctions*, Center for American Progress (2006), p. 19-20 (“*Center for American Progress Report*”) (analyzing the FCC spectrum auction winners and losers). DEs also secured a significant share of the net value of winning bids in the above auctions, illustrating that

- In Auction 5, PCS C Block, 89 entrepreneurs acquired 493 licenses;
- In Auction 10, PCS C Block re-auction, 7 small businesses acquired 18 licenses;
- In Auction 11, PCS D, E, and F Blocks, 93 small businesses won 598 licenses;
- In Auction 14, WCS, 8 small businesses acquired 32 licenses; and
- In Auction 22, PCS, 48 small businesses acquired 277 licenses.²⁹

Measured by the net value of licenses won, DE participation in spectrum auctions was over 70% in a total of six commercial mobile radio service auctions from 1996 to 2005.³⁰

Notwithstanding the large number of DE winners in the first few years of auctions, some commenter's have criticized the DE program for its failure to increase competition or serve the public interest citing to the outcome of the FCC's Personal Communications Services ("PCS") C block Auction #5 in 1996.³¹ Such arguments conveniently ignore the numerous circumstances, many outside of DE control, that impacted the outcome of C block, including several problems caused by the FCC.

A comparison of the PCS Broadband auctions dating back to 1994 is set out below to shed light on the program's criticism. The PCS Broadband service was designed to be auctioned in six spectrum blocks and the A & B blocks were scheduled first.³² Compared to the 255 entities in the C block bidder pool, the A and B block Auction #4 completed in 1995, for example, contained only 30 bidders which were dominated by the well-financed incumbent telephony, paging, cellular and cable providers and/or strategic coalitions of such incumbents. The differences between the two auctions could not be more significant.

DEs did not just win a lot of small and leftover markets. DEs won the following in net value: Auction 5 - \$10,071 Million (100%); Auction 10 - \$905 Million (100%); Auction 11 - \$761 Million (30%); Auction 14 - \$2 Million (17%); and Auction 22 - \$390 Million (94%). Revenue calculations based on FCC auction factsheet and summary databases, available at http://wireless.fcc.gov/auctions/default.htm?job=auctions_home (last visited Feb. 15, 2014).

²⁹ *Id.*

³⁰ *Council Tree Communications, Inc. v. FCC*, 619 F.3d 235 (3d Cir. 2010), *cert. denied sub nom. Council Tree Investors, Inc. v. FCC*, 131 S. Ct. 1784 (2011).

³¹ See, e.g. Fred Campbell, *Maximizing the Success of the Incentive Auction* (Nov. 4, 2013), p. 3-10 (research prepared for the Expanding Opportunities for Broadcasters Coalition and Consumer Electronics Association).

³² *Fifth R&O*, at 5535-36 ¶¶ 6-7. The C and F blocks were closed auctions, exclusively for DEs. *Id.* at 5538 ¶12.

The C block bidder pool represented a 750% percent increase over the number of bidders for A and B blocks, and consisted entirely of small, MBE, WBE, and entrepreneur entities - new entrants in wireless. As the U.S. Small Business Administration noted at the time, “[t]he absence of such traditional telecommunications providers in C block could have facilitated the vigorous competition not present in A and B [blocks] – resulting in higher bids for C.”³³

The saga of the C block began with multiple delays. Litigation (and the threat of litigation) delayed its start, and following the Supreme Court’s decision in *Adarand Constructors, Inc. v. Peña* in June 1995, the FCC had to change the DE rules to eliminate any race-based and gender-based classifications.³⁴ Significant delays hampered the ability of small and minority-owned businesses and new entrants to raise capital and construct networks in a timely manner, especially given the fact that existing carriers, including those who were winners of A and B block, cellular, and Specialized Mobile Radio licenses, had a head start.³⁵

NextWave Personal Communications, Inc. was the single largest auction winner in C block with \$4.74 billion in winning net bids for 63 licenses. The FCC’s evaluation of NextWave’s PCS applications compounded the already precarious start to C block. The FCC did not complete its review and grant

³³ Letter to FCC Chairman Reed Hundt from Jere W. Glover and S. Jenell Trigg, Office of Advocacy, U.S. Small Business Administration, WT Docket No. 97-82, Sept. 8, 1997 at 2 (addressing the various issues related to C block and offering recommendations for the FCC’s restructuring efforts.) (“Advocacy FCC Letter”). “Even though D-F [block] prices were on the average less than C, several BTAs in D and E blocks *exceeded* C block bids in the amount bid and price per pop – for less spectrum. Does this mean that C block bids, in those particular markets, were too low or, alternatively, that the D and E bids were excessive?” (emphasis in original) (footnotes omitted). *Id.* In 1998-1999, the value of the C block licenses significantly increased in value, but many DEs, as new entrants, were not able to sustain holding onto the licenses during the telecommunications market downturn in 1995-1997. Patrick S. Ryan, *The court as a spectrum regulator: will there be a European analogue to U.S. cases NextWave and GWI?*, 4 German L.J., 149, 157 (2003), http://germanlawjournal.com/pdfs/Vol04No02/PDF_Vol_04_No_02_149-167_European_Ryan.pdf (last visited Feb. 14, 2014).

³⁴ See Bush and Martin, *supra* n. 17, at 423-433.

³⁵ See *Implementation of Section 309(j) of the Communications Act – Competitive Bidding, Sixth Report and Order*, 11 FCC Rcd 136, 140 ¶6 (1995) (“*Sixth R&O*”), *aff’d sub nom. Omnipoint Corp. v. FCC*, 78 F.3d 620 (D.C. Cir. 1996) (citations omitted) (cautioning that further delay of the C block auction, even to supplement the administrative record to meet the strict scrutiny standard of review required by *Adarand* [*infra* note 64] would put C block winners at a greater competitive disadvantage in the CMRS market compared to incumbents).

NextWave PCS's applications for eight months because it had to first respond to various petitions to deny filed against NextWave alleging ownership and structural violations.³⁶ The NextWave delay impacted other successful and qualified winners in basic trading areas ("BTAs") contiguous with NextWave. Many DEs could not construct with NextWave's applications in limbo. Equipment and other vendors needed to configure the dominant winner's network and technology but could not with NextWave's application unresolved. And without NextWave's confirmation on its transmission technology and specifics, vendors were also hesitant to confirm orders or agreements for other DE winners. Further, large incumbent providers and those who won A and B block licenses were reluctant to enter into reasonable roaming agreements with the upstart new entrants in the C block. NextWave, which won bids in contiguous BTAs to many winning DEs, was initially a small business new entrant's best option. During the FCC's delay in granting NextWave's licenses, the market value of PCS licenses declined significantly and NextWave tried unsuccessfully to reduce its \$3.72 billion debt to \$1.02 billion.³⁷ NextWave subsequently filed for bankruptcy in 1998 primarily due to difficulty in raising capital in time for the next installment payment due date.³⁸ Unfortunately, NextWave was not alone.

In an effort to prevent another default or bankruptcy, the Wireless Telecommunications Bureau suspended all bidding payments the day they were due.³⁹ Although well intended, this action cast a negative stigma on all DE winners of C block (and other auctions), even those experienced DEs that made

³⁶ *Wireless Telecommunications Bureau Announces Conditional Grant of Broadband Personal Communications Services Entrepreneurs' C Block Licenses to NextWave Personal Communications, Inc.*, FCC Public Notice, DA 97-12 (Jan. 3, 1997). See also *In re Applications of NextWave Personal Communications, Inc. for various C-Block PCS Licenses*, Order, 12 FCC Rcd 2030 (1997).

³⁷ See *FCC v. NextWave Personal Communications Inc.*, 537 U.S. 293, 298 (2003) (citations omitted). Note that another DE, General Wireless Inc., was successful in a different court to significantly reduce its principal balance due to the FCC. *Ryan Article* at 158-9 (allowing GWI to avoid approximately \$894 million of its initial \$954 million obligation to the FCC). The financial markets were not kind to DEs still trying to raise capital in light of this significant loss of PCS C block value.

³⁸ See *id* at 297.

³⁹ *In re Installment Payments for FCC Licenses*, DA 97-649, Order, 12 FCC Rcd 17325 (1997).

their installment payments on time and were ready to construct.⁴⁰ Not only was the valuable capital of those DEs tied up with the FCC indefinitely but equipment and other vendors imposed additional terms and requested significant upfront deposits and/or engineering studies even for those DEs not in financial distress.⁴¹ As a result, C and F block winners had to spend more time and money to catch up to the significant head start that A and B block winners enjoyed. In short, the success of the PCS C and F blocks were doomed before the FCC's restructuring efforts were completed.

Those winning DEs in C and F blocks that survived the compounded impact of the numerous stays, negative press, overbroad criticism of inexperience and overpaying, loss of investors, protracted NextWave litigation, and FCC regulatory actions, went on to construct and offer innovative pricing and services. For example, Cook Inlet Region, Inc. ("CIRI"),⁴² Chase Telecommunications, Inc. ("ChaseTel"),⁴³ and TriCo Wireless PCS, Inc. ("TriCo"),⁴⁴ all MBEs, were successful DEs. While these

⁴⁰ See Advocacy FCC Letter at 3-4 (citations omitted). In essence, the FCC acted as both a creditor and regulator, which resulted in an inherent conflict of interest to the detriment of DEs. See *id.*

⁴¹ *Id.*

⁴² A subsidiary company of CIRI, an Alaska Regional Corporation organized under the Alaska Native Claims Settlement Act, 47 U.S.C. §§1601 *et seq.*, was one of the first and few DE PCS block winners to build out. It launched services in the Tulsa, Oklahoma BTA in partnership with Western Wireless. CIRI was acquired by predecessor companies to T-Mobile USA. Without CIRI and its substantial independent footprint, T-Mobile and the aggressive competition T-Mobile provides would not exist today.

⁴³ The major principal in ChaseTel was Anthony R. Chase, an experienced African American entrepreneur with extensive investments in broadcasting and wireless. ChaseTel was a winning bidder in C block and constructed operations in Tennessee. ChaseTel was a partner with Qualcomm Inc. and deployed its service using QUALCOMM's wireless infrastructure and CDMA digital technologies. QUALCOMM ultimately purchased ChaseTel's licenses and initiated its Leap service,

⁴⁴ The principal owner of TriCo was Richard L. Vega, Sr., an experienced wireless operator of Hispanic ethnicity. TriCo was a small and minority-owned business and its predecessor companies (also owned by Vega) were the successful winners of C, D, and F block licenses in underserved and unserved BTAs located in Minnesota, West Virginia, and Missouri. TriCo exceeded its 5-year and 10 year construction benchmarks in the Duluth, Minnesota and St. Joseph, Missouri BTAs. TriCo strategically selected BTAs where the larger incumbent national providers had ignored and focused instead of serving those communities as a "neighborhood" provider. TriCo secured investments from several minority-owned or targeted private equity providers including Opportunity Capital Partners, Pacesetter Capital, Fleet Development Ventures, and Fulcrum Venture Capital Corporation, but it needed to secure more capital to operate, advertise on the retail market, and pay its installment payments to the FCC. It invested more than a year to unsuccessfully secure a loan from the Rural Utility Service, but the application process was not favorable to non-incumbent rural telecoms. TriCo sought a waiver or suspension of its installment payments for select licenses given the collapse of the financial markets after September 11, 2001 to provide additional time to

DEs ultimately sold to larger companies, a standard exit strategy for new entrants that received private equity support, their legacy endures in the form of innovative pricing and services offered by T-Mobile, Leap,⁴⁵ and Nsighttel Wireless, each with origins as DEs. Notwithstanding the C block saga, the FCC still reported that a significant number of MBE DEs participated in the auctions.⁴⁶ This limited success in promoting DEs as facilities-based providers might have been exponentially greater if the C block had been auctioned first.

III. The FCC Adopted Rule Changes that Hampered New Entrant DE Participation

Similar to their actions in the C block saga, the FCC continued to dismantle the positive gains from early auctions when it made material changes to its long standing DE eligibility rules. This happened just days before the short form application deadline for the Advanced Wireless Services auction, Auction 66, in 2006. The FCC took an approach that conflicted with its historic concern for, and tangible efforts to help, DEs secure capital, particularly in the auction context. Ultimately, the U.S. Court of Appeals for the Third Circuit vacated two of the three new rules the Commission adopted that year, with the Court

prosecute its RUS application. It ultimately filed for bankruptcy. TriCo sold its licenses to several different companies, including Nsighttel Wireless, LLC, a subsidiary of Northeast Communications of Wisconsin, Inc. Nsighttel Wireless has retained TriCo's focus as a local and community-based service provider in Duluth.

⁴⁵ Qualcomm's spinoff Leap Wireless successfully launched Cricket Wireless, a revolutionary wireless company that provides affordable wireless services to a wide range of customers, without credit checks or long-term commitments, and in particular those in urban markets and inner cities. Leap Wireless International (LEAP) February 2009, Securities Exchange Commission Filing, 10K [http://www.wikininvest.com/stock/Leap_Wireless_International_\(LEAP\)/Cricket_Business_Strategy](http://www.wikininvest.com/stock/Leap_Wireless_International_(LEAP)/Cricket_Business_Strategy) (last visited Feb. 5, 2014). See also Leap Wireless: Who We Are, available at <http://www.leapwireless.com/who-we-are/wireless-industry> (last visited Feb. 15, 2014) (Leap was founded on September 23, 1998 as a spin off of Qualcomm to advance its vision "to provide affordable wireless services to a wide range of customers). Cricket has added a competitive edge to the industry with its disruptive business model. At this writing, AT&T is in the process of acquiring Leap.

⁴⁶ See FCC News, *Wireless Bureau Chief Daniel Phythyon Hails Success of Market-Based Spectrum Policies* (Sept. 11, 1997) (noting that "to date 80% of license winners in FCC spectrum auctions are small businesses, 22% of which are minority-owned and 18% woman-owned.")

citing “serious” violations of the Administrative Procedure Act’s public notice and comment requirements.⁴⁷

The FCC also enacted a number of rules that hampered, if not negated DE participation. Notably, the FCC doubled the “*post-auction unjust enrichment penalty repayment period*” from five to ten years (“*Unjust Enrichment Rule*”),⁴⁸ the time auction winners had to maintain the same ownership before assessed a penalty. The agency also imposed a 100% bid credit repayment obligation (plus interest) on licensees that sold their interest in their licenses during the first five years after winning an auction.⁴⁹ The FCC also stripped DE eligibility status altogether from any entity that leased or resold (including on a wholesale basis) more than 50% of the aggregate spectrum capacity won at auction (“*Impermissible Relationship Rule*”).⁵⁰ The new change in the 50% rule forced start-up DEs to compete immediately with entrenched incumbents on a retail, direct-to-the-public basis. The *Attributable Material Relationship Rule* impacted a DE’s ability to enter into lease, wholesale, and resale arrangements with any one entity for more than 25% of the DE’s spectrum capacity by making the gross revenue of that entity (and if applicable, its total assets), as well as the controlling interests, affiliates, and affiliates of the controlling

⁴⁷ *Council Tree Communications, Inc. v. FCC*, 619 F.3d 235, 258 (3d Cir. 2010) (subsequent history omitted). The court also expressed serious concern as to the substantive lawfulness of both the *Impermissible Relationship and the Unjust Enrichment Rules*. The court “note[d] that the FCC does not appear to have thoroughly considered the impact of the extended [ten year] repayment schedule on DEs’ ability to retain financing.” *Id.* at 255 n. 8. It further found that the Commission was “confused” about “the maximum period for which investors are willing to lock up their capital (before being able to liquidate the spectrum license, in the event the DE proves unprofitable) *Id.* Likewise, the court criticized the agency’s “inattention to the nature of the wireless wholesaling business,” in which a DE would “build and operate” new, wireless transmission facilities and then sell that new capacity to other existing companies, thereby promoting competition. *Id.*

⁴⁸ 47 C.F.R. §1.2111(d)(2)(i) (2006) (vacated 2010). See also *In the Matter of Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission's Competitive Bidding Rules and Procedures et al.* 27 FCC Rcd 908 (2012). The five year unjust enrichment period had been adopted after an extensive notice and comment rulemaking in 1994. See *Implementation of Section 309(j) of the Communications Act - Competitive Bidding*, Third Report and Order, 9 FCC Rcd 2941, 2975-76 ¶80 (1994).

⁴⁹ 47 C.F.R. §1.2111(d)(2)(i) (2006) (vacated in part, 2010). See also *In the Matter of Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission's Competitive Bidding Rules and Procedures et al.* 27 FCC Rcd 908 (2012).

⁵⁰ 47 C.F.R. §1.2110(b)(3)(iv)(A) (2006) (vacated 2010). See also *In the Matter of Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission's Competitive Bidding Rules and Procedures et al.* 27 FCC Rcd 908 (2012).

interests of that entity, attributable to the DE.⁵¹ As shown below, the effects were both detrimental and immediate.

DEs planning to participate in Auction 66 lost financial sources that had been cultivated for more than a year due to the regulatory uncertainty and unreasonable restrictions the new rules placed on financial markets. New entrant DEs seeking to become facilities-based providers (but via wholesale or leasing arrangements) had to completely revise or abandon their business plans. The damaging DE Rules were also in place for the next major broadband auction, Auction 73. With Auction 73, the FCC planned to auction off 700 MHz licenses reallocated from broadcasters. This portion of the airwaves was considered especially valuable spectrum and dubbed “beachfront” property. Many DEs, however, were not able to recover after Auction 66 and did not participate in Auction 73.⁵² As a result, both Auctions 66 and 73 showed a precipitous drop in DE participation from the average 70% value of winning bids over previous years, to only 4.0% and 2.6%, respectively.⁵³ Although DEs won 20% of Auction 66 licenses and 35% of Auction 73 licenses, the licenses were mostly for small markets.⁵⁴ Moreover, rural telcos dominated as the more successful DEs, and there were few new entrants, especially MBEs, in Auction 73. Despite the lack of meaningful bidding competition from new entrant DEs, the underlying value of the spectrum offered in Auctions 66 and 73 generated nearly \$14 billion and \$19 billion in revenues, respectively. DEs won only a little over \$500 million in each auction.

⁵¹ 47 C.F.R. §1.2110(b)(3)(iv)(B) (2006).

⁵² Many DEs supported the petitioners in the Council Tree litigation as amicus curiae. Many were not able to participate in either Auction 66 or Auction 73. (Over the years they included Antares Holding, LLC, Arizona Hispanic Newswire LLC, Business Intelligence Solutions, Dempster Group, LLC, Faithfone Wireless, Inc., Kinex Networking Solutions, Inc., OVTC, Inc., Rocking “R” International, Inc., Wirefree Partners, LLC, Xanadoo 700 MHz DE, LLC, in addition to several individuals who were principals in DEs that were no longer in business). For example, the 2006 DE Rules restriction on leasing, reselling and wholesaling plus the imposition of a much longer unjust enrichment period prevented Wirefree from participating in any further auctions. Previously, it won 16 wireless licenses for which it paid \$150 million.

⁵³ *Council Tree*, 619 F.3d at 248.

⁵⁴ For example, in Auction 73, the 70 most valuable licenses yielded 80% of the auction’s total revenue (\$15.2 billion). DEs acquired *none* of these licenses.

In contrast, the largest incumbent providers won the rights to the bulk of the most valuable licenses. In Auction 73, AT&T and Verizon Wireless captured an aggregated 84.4% of the total value.⁵⁵ Ten years prior to the 2006 DE Rules, barely more than 10% of bidders in any auction were routinely able to acquire 50% or more of the available licenses.⁵⁶ These results directly contravened the key Section 309(j) congressional mandates that direct the FCC to design auctions so as to *promote* DE participation and *avoid* excessive concentration of licenses.⁵⁷ In fact, the detrimental changes the FCC made in its 2006 revised designated entity rules rapidly ushered in the conditions that Congress feared in the transition to competitive bidding.

Between the completion of Auction 66 and the start of Auction 73, the FCC had advance warning of the negative practical impact of its rule changes on small businesses, yet it did nothing to reverse course.⁵⁸ Such inaction on the DE rule changes enabled the two largest incumbent wireless companies to dominate Auction 73. The rule changes were detrimental not only to small businesses and new entrants, but also to both competition in the mobile wireless marketplace and the public that relies on mobile services. Today, the consequences of the 2006 rule changes still reverberate strongly in a wireless

⁵⁵ See Saul Hansell, *Verizon and AT&T Win Big in Auction of Spectrum*, N.Y. TIMES (Mar. 21, 2008), available at <http://www.nytimes.com/2008/03/21/technology/21auction.html> (last visited Feb. 5, 2014) (“The two largest cellphone service providers – Verizon Wireless and AT&T – won a greater swath of radio spectrum in the government auction that ended this week, heading off new competition that could have led to lower prices for consumers.”).

⁵⁶ *Center for American Progress Report*, *supra* note 28 at 7.

⁵⁷ “[C]onsistent with the public interest, convenience, and necessity, the purposes of this Act, and the characteristics of the proposed service, prescribe area designations and bandwidth assignments that promote (i) an equitable distribution of licenses and services among geographic areas, (ii) economic opportunity for a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women, and (iii) investment in and rapid deployment of new technologies and services...” 47 U.S.C. §309(j)(4)(C).

⁵⁸ See, e.g., *Comments of Office of Advocacy, U.S. Small Business Administration*, WT Docket No. 06-150 *et al.*, (May 21, 2007), p. 2 (“Because the revisions made to the FCC’s ‘designated entity’ (‘DE’) rules have encumbered small business participation in auctions, we recommend that the FCC stay these rules for the 700 MHz auction and rely instead upon the original DE rules.”)

marketplace dominated by large incumbent carriers in which the FCC and the United States Department of Justice are struggling to foster healthy competition.⁵⁹

Concerns about the declining participation of MBEs continued into 2009. The FCC's Diversity Advisory Committee's Telecom and Broadband Issues Subcommittee presented the visualization below of the devastating impact of the 2006 DE Rules:⁶⁰

⁵⁹ See, e.g., *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile, Wireless, Including Commercial Mobile Services*, Sixteenth Report, 28 FCC Rcd 3700, 3736 ¶26 and 3763 ¶70 (2013) ("16th Annual Mobile Competition Report").

⁶⁰ FCC Advisory Committee on Diversity for Communications in a Digital Age Telecom and Broadband Issues Subcommittee, *Proposal to Restore the FCC's Designated Entity ("DE") Program*, (Sept. 14, 2009), available at <http://transition.fcc.gov/DiversityFAC/092209/broadband-sub-proposal-de.pdf> (last visited Feb. 6, 2014). The Diversity Advisory Committee also issued a resolution to rescind the *Unjust Enrichment, Impermissible Relationship and Attributable Material Relationship Rules*. *Id.* at Appendix I.

- **RESULT: DE Auction Success Has Declined to Near-Zero (Net Winning Bids, \$ in billions)**

BEFORE DE Rule Change: 1994 – April 2006

\$45.2 Billion of Licenses in 64 Auctions



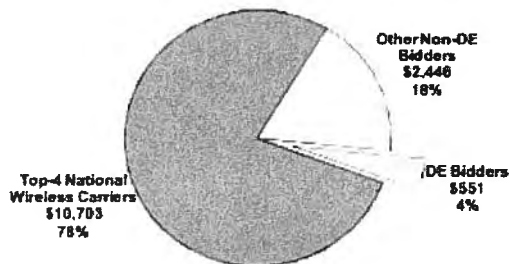
AFTER DE Rule Change: April 2006 – 2008

\$32.8 Billion of Licenses, Principally Auctions 66 / 73

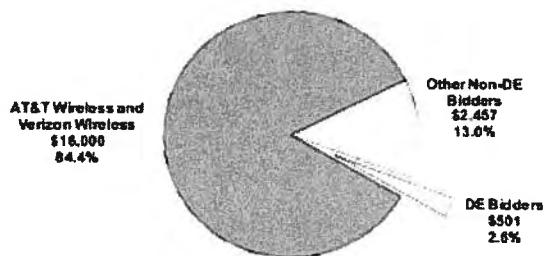


- **The New DE Rules, Along with No Closed Auctions, Have Resulted In DE Auction Success Declining to Near Zero**

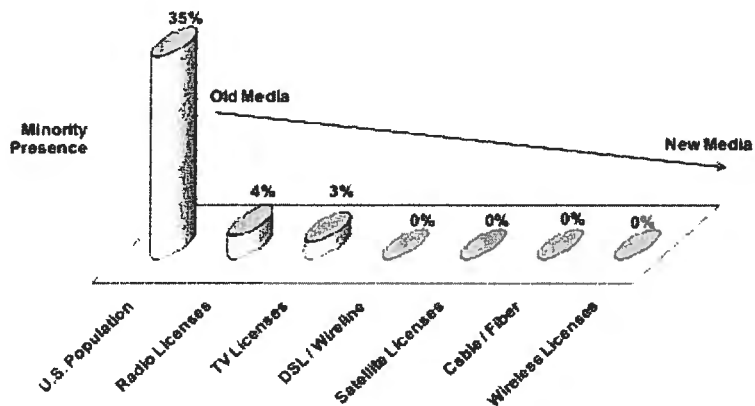
**DE Participation in Auction 66
By Winning Net Bids (in \$ millions)**



**DE Participation in Auction 73
By Winning Net Bids (in \$ millions)**



- **Eliminating DE Competition Only Worsened the Near Total Absence of Minority Ownership**
(data rounded to nearest whole number)



Individual FCC Commissioners also took note of the impact of the FCC's failure to address harmful DE rules. Reviewing the abysmal results of Auction 73, former Commissioner Jonathan Adelstein noted that "women-owned bidders failed to win any licenses and minority-owned bidders won less than one percent of licenses (7 of 1,090 licenses, or .64%)." ⁶¹ This result, according to former Commissioner Adelstein, was inexcusable considering "*that women constitute over half the U.S. population and minorities around one-third of the U.S. population.*" ⁶² Commissioner Adelstein's remarks below also captured the frustration of many when he lamented that:

It's appalling that women and minorities were virtually shut out of this monumental auction. It's an outrage that we've failed to counter the legacy of discrimination that has kept women and minorities from owning their fair share of the spectrum. Here we had an enormous opportunity to open the airwaves to a new generation that reflects the diversity of America, and instead we just made a bad situation even worse. This gives whole new meaning to "white spaces" in the spectrum. ⁶³

IV. *Adarand* and DE Program Administration

In June 1995, the U.S. Supreme Court handed down its decision in *Adarand Constructors Inc. v. Peña*, 515 U.S. 200 (1995). *Adarand* mandated that all federal race-based programs, even those designed to benefit racial and ethnic minorities, must meet the standard of strict scrutiny review requiring a compelling governmental interest and narrowly tailored to meet that interest. ⁶⁴ After the decision, the FCC reevaluated all of its regulations in all industries and changed its minority- and gender-based classifications for auctions to a race-neutral small business, revenue-based size standard in order to avoid

⁶¹ Commissioner Jonathan S. Adelstein Comments on Lack of Diversity Among Winners of the 700 MHz Auction, FCC News Release (Mar. 20, 2008).

⁶² *Id.*

⁶³ *Id.*

⁶⁴ *Adarand Constructors, Inc. v. Peña*, 515 U.S. 200, 227 (1995); see also S. Jenell Trigg, *The Federal Communications Commission's Equal Opportunity Employment Program and the Effect of Adarand Constructors Inc. v. Peña*, 4 CommLaw Conspectus 237 (1996).

protracted litigation.⁶⁵ The FCC justified this change with the rationale that many minority- and women-owned businesses would also be small. The Commission stated it could still meet its statutory requirements under Section 309 (j) without further delay and litigation, writing, “elimination of the race- and gender-based measures . . . would be consistent with our duty to implement the Budget Act, since we believe that many designated entities would qualify as small businesses under our rules.”⁶⁶ Some parties challenged the FCC’s decision to change the standard to a race-neutral, small business classification, but the FCC ultimately prevailed.⁶⁷

Just months after the *Adarand* decision, the Telecommunications Act of 1996 (“1996 Act”) became law.⁶⁸ This landmark legislation ushered in an unprecedented level of market disruption allowing vertical integration of telecommunications services and consolidation. During the deliberations prior to passage of the 1996 Act, certain members of Congress were concerned that the “big business” bill would have detrimental impacts on small businesses, especially minority- and women-owned businesses. In a statement after its passage, former Congresswoman Cardiss L. Collins stated:

[W]hile we should all look forward to the opportunities presented by new, emerging technologies, we cannot disregard the lessons of the past and the hurdles we still face in making certain that everyone in America benefits equally from our country’s maiden voyage into cyberspace. I refer to the well-documented fact that minority and women-owned small businesses continue to be extremely underrepresented in the telecommunications field.⁶⁹

Given this concern, but wary of the Supreme Court’s decision in *Adarand* and Congress’ anti-affirmative action stance, the negotiations leading up to the 1996 Act added two provisions designed to promote “small business.” Section 257, on Market Entry Barriers (codified at 47 U. S. C. § 257), and

⁶⁵ See generally *Sixth R&O*, *supra* note 35. Although gender-based programs were subject to a lower degree of scrutiny, the FCC also eliminated its gender-based rules as a precaution. See *id.*

⁶⁶ *Sixth R&O* at 141 ¶8.

⁶⁷ See generally *Omnipoint Corp. v. FCC*, 78 F.3d 620 (D.C. Cir. 1996).

⁶⁸ Pub. L. No. 104–104, 110 Stat. 56 (1996).

⁶⁹ 142 Cong. Rec. H1141 at H1176-77 (daily ed. Feb. 1, 1996) (statement of Rep. Cardiss L. Collins, sponsor of Section 257).

Section 714, on the Telecommunications Development Fund (codified at 47 U. S. C. § 614), were adopted with the promise that each would help small businesses compete in the newly configured telecommunications arena.⁷⁰ Section 257 mandates that the FCC identify and eliminate market entry barriers, and release a triennial report to Congress on its efforts.⁷¹ The Telecommunications Development Fund (“TDF”), *inter alia*, was designed to provide both debt and equity capital for small telecommunications businesses.⁷² Regrettably, neither provision has lived up to its promise to promote MBEs in the wireless industry in any meaningful way.

In short, the “small business” provisions have been largely ineffective, and the Section 257 requirement is merely an obligation to study the industry every three years and issue a report to Congress.⁷³ In practice, Section 257 has not operated as a mandate to resolve major market barriers or market failure.⁷⁴ And given the relatively small amount of capital that it had to invest, the TDF was limited in the types and number of transactions that it selected and could not help new entrant MBEs.⁷⁵

Today’s political climate has also stirred proposals to terminate and/or defund the TDF on the grounds that it is ineffective and redundant. Opponents claim that “[t]he fund has not demonstrated significant success in meeting its statutory goals, and its efforts overlap with several other Federal

⁷⁰ See S. Jenell Trigg, *Section 714 – The Telecommunications Development Fund: Making a Difference?* in *The Success and Failure of the 1996 Telecommunications Act* 191 (Civil Rights Forum on Communications Policy, ed., 2002) (“*Trigg TDF Article*”).

⁷¹ See, e.g., David Honig and Moushumi Khan, *Section 257- Eliminating Market Entry Barriers: The Best New Hope for Diversity and Inclusion*, in *The Success and Failure of the 1996 Telecommunications Act* 153, 156-57 (Civil Rights Forum on Communications Policy, ed., 2002).

⁷² See *Trigg TDF Article* at 199-200.

⁷³ See *Comcast Corporation v. FCC*, 600 F.3d 642, 659-60 (D.C. Cir. 2010).

⁷⁴ See *id.*

⁷⁵ TDF did not provide debt financing because of its statutory requirements to make loans in accordance with the provisions of the Federal Credit Reform Act of 1990. *Trigg TDF Article* at 200 (citations omitted). TDF explained that most start-ups do not have sufficient collateral or assets to qualify for the credit-worthy loans. *Id.*

programs and the private sector.”⁷⁶ Notwithstanding the purported issues with the TDF, it has been SBA loan programs that have not fulfilled the need for financing wireless providers, especially for auctions. Nor is the TDF’s statutory mandate to “stimulate new technology development, and promote employment and training; and to support universal service and promote delivery of telecommunications services to underserved rural and urban areas”⁷⁷ duplicative of the FCC Universal Service Fund (“USF”). The TDF supports the entry of new service providers that can reach unserved or underserved communities where there are few, if any, incumbent providers; the USF provides funding to providers to help offset the high cost of delivering telecommunications services. The two serve distinctly different, yet essential purposes.

V. The FCC’s Failed DE Program Undermines MBEs, Communities and Competition

The theme of the DE Program could well be that “[t]hose who cannot remember the past, are condemned to repeat it.”⁷⁸ The FCC’s missteps, in particular the impact of last minute rule changes that negatively affected a DE’s ability to raise capital, have served to eviscerate the DE program at a time when MBE ownership is more important than ever before. The ability of MBEs to compete represents the growing shift in the country’s demographics and the resounding need to ensure that minorities are producers in this industry. Despite a slight shift from explicit discriminatory business practices, structural and legal limitations still exist for MBEs. MBEs still experience significant barriers to participate in our economy and in FCC-regulated industries,⁷⁹ often due to limited access to “patient capital,”⁸⁰ the presence

⁷⁶ 112 Congress, Concurrent Resolution on the Budget - Fiscal Year 2012 at 80, Gov’t Printing Office (April 11, 2011).

⁷⁷ 47 U.S.C. §§614(a)(2) and (3).

⁷⁸ George Santayana, Reason in Common Sense, Vol. 1 of The Life of Reason (emphasis added).

⁷⁹ In 2007 of 27.1 million businesses in the United States, there were 1.9 million African American owned businesses, 2.3 million were Hispanic American owned businesses, and 7.8 million women-owned businesses. SBA Office of Advocacy, Frequently Asked Questions (Sept. 2012), p. 2, available at http://www.sba.gov/sites/default/files/FAQ_Sept_2012.pdf (last visited Feb. 5, 2014). In the communications arena, MWBEs have significant known barriers to entry. See, e.g., United States Government Accountability Office, Report to the Chairman, Subcommittee on Telecommunications and the Internet, Committee on Energy and

of discrimination in deal flow, financing and construction, and the lingering negative effects of past discrimination. In addition to the increasingly precarious position that MBEs and entrepreneurs occupy in the capital-intensive mobile broadband sector, MBEs also have to contend with a widening racial wealth gap, educational disparities, and an opportunity divide.⁸¹

With the stakes this high, the FCC should do more to provide realistic opportunities for MBEs to compete in the wireless industry. While prior FCC decisions served to undermine the goals of diversity and inclusion, the aspiration for a more inclusive and representative marketplace should be an achievable goal for the FCC, particularly those decisions and programs that serve to boost competition, foster innovation, provide mobile services to underserved and unserved communities,⁸² and stimulate job growth in underemployed communities. More broadly, discussed below are three economic incentives for swift action:

Commerce, Outlets in Local Markets, While Ownership by Minorities and Women Appears Limited and Is Difficult to Assess (March 2008), available at <http://www.gao.gov/assets/280/273671.pdf> (last visited Feb. 5, 2014).

⁸⁰ “Patient capital” is a financial investment that provides sufficient time and support for an entity to grow the business, and does not require a relatively quick sale of the business to capture a return on investment. To attract patient capital, the regulatory environment needs to be stable and allow a business flexibility to address new developments in market conditions and/or compete on the same level as other entities in its industry. The FCC was very much concerned about the stability of the regulatory process and the impact on the financial and investment community when it restructured C block, remarking that “[t]hese elements [*i.e.*, maintaining the integrity for future auctions and ensuring that all participants are treated fairly and impartially] are essential if the financial community is to have the stability it requires to fund the new communications enterprises and services for which this spectrum should be used.” *Amendment of the Commission's Rules Regarding Installment Payment Financing For Personal Communications Services (PCS) Licensees, Second Report and Order and Further Notice of Proposed Rulemaking*, 12 FCC Rcd 16436, 16438 ¶3 (1997).

⁸¹ See Reply Comments of the Minority Media and Telecommunications Council, *State of Mobile Wireless Competition*, WT Docket No. 13-135 (July 25, 2013) at 5.

⁸² “Most notably, 2.5 million more people living in rural areas, who did not have access to any mobile broad service broadband in August of 2010, now benefit from this service Unfortunately, it appears that over the same two year period, more people living in rural areas have two or fewer options for mobile voice service . . . that figure has increased to approximately 7.7 million. Despite the billions invested on mobile networks each year, I must say that it is disappointing to see 400,000 Americans still lacking access to any mobile service option.” Statement of Commissioner Mignon L. Clyburn, Re: *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, including Commercial Mobile Services*, *supra* note 59, at 4035.

1. MBEs Contribute Significantly to the National Economy and Promote Local Economic Development.

The U.S. Department of Commerce's Minority Business Development Agency ("MBDA"), for example, has illustrated the value that MBEs generally add to U.S. economic output.⁸³ Using Census data, the MBDA found that, as a result of a rapidly growing minority population, MBEs annually contribute \$1 trillion to U.S. aggregate economic output. MBEs are also more likely than non-minority-owned businesses to export and conduct business in a language other than English.⁸⁴ MBEs also regularly invest in communities that other companies overlook or underserve.⁸⁵ These facts are evidenced by the fact that MBE employment continues to grow even as overall employment declines.⁸⁶ The MBDA has also noted how minority business development actually enhances innovation. A 2010 MBDA report stated:

Barriers to entry and expansion faced by MBEs are very costly to U.S. productivity, especially as minorities represent an increasing share of the total population ... by limiting the business success to only a few groups and not the broad range of diverse groups that comprise the United States we are constraining innovative ideas for new products and services, and access to global markets where many minority entrepreneurs have a competitive advantage based on cultural knowledge, social and familial ties, and language capabilities.⁸⁷

⁸³ See U.S. Department of Commerce, Minority Business Development Agency, U.S. Business Fact Sheet, available at <http://www.mbda.gov/sites/default/files/MinorityOwnedFirmsLeadExportsFinal.pdf> ("MBDA Fact Sheet") (last visited Feb. 5, 2014).

⁸⁴ See *id.*

⁸⁵ *Id.*

⁸⁶ See Robert W. Fairlie, Ph.D. and Alicia M. Robb, Ph.D., Disparities in Capital Access between Minority and Non-Minority-Owned Businesses: The Troubling Reality of Capital Limitations Faced by MBEs, U.S. Department of Commerce, Minority Business Development Agency (Jan. 2010), p. 12 ("MBDA 2010 Disparities in Capital Report") ("For all minority-owned firms, employment increased by 4 percent between 1997 and 2002. In contrast, total employment actually declined by 7 percent among non-minority firms from 1997 to 2002. *If not for employment growth among minority-owned firms over this period the loss in total employment would have been even larger: an additional 160,000 jobs would have been lost.*"). Further, between 2002 and 2007, the number of minority owned businesses increased more than two times the national rate. See Census Bureau Reports Minority Business Ownership Increasing at More than Twice the National Rate, Census Bureau News Release (July 13, 2010), available at http://www.census.gov/newsroom/releases/archives/economic_census/cb10-107.html (last visited Feb. 5, 2014).

⁸⁷ See MBDA 2010 Disparities in Capital Report at 8.

2. Continued Discriminatory Practices Have an Economic Cost.

As observed by U.S. Senator Kirsten E. Gillibrand, promoting the talent of women and minority businesses and the next generation of entrepreneurs is critical to U.S. economic recovery.⁸⁸ Limiting inherent entrepreneurial, managerial, creative, and innovative skills based on race or gender restricts competition, GDP, and economic growth. Economist Andrew F. Brimmer,⁸⁹ calculated the cost that racial discrimination placed on our economy in billions of dollars – and that was 20 years ago.⁹⁰ For example, the failure to fully utilize the existing skills of African Americans and the failure to improve education for African Americans costs the U.S. billions of dollars in societal growth.⁹¹ As a result, racial discrimination cost our nation approximately 3.8% of our GDP or \$241 billion in 1993.⁹² In 2002, former FCC Chairman Kevin Martin asserted the positive relationship between diversity and competition:

By choosing candidates from a larger, more diverse pool, broadcasters and MVPDs will be better able to find the most qualified candidates. A more talented workforce leads to improved

⁸⁸ See, e.g., U.S. Senator Kirsten E. Gillibrand, *A Guide to Women and Minority-Owned Business Funding Opportunities* (2013), p. 5, available at <http://www.gillibrand.senate.gov> (search for “A Guide to Women and Minority-Owned Business Funding Opportunities”) (last visited Feb. 5, 2014) (“America’s economic recovery will, in part rest on our ability to unlock the economic potential of women and minority entrepreneurs. If we can promote the talent of women and minority business leaders and foster the success of a new generation of entrepreneurs, then America’s economy will be stronger than ever. Today, there are nearly 20 million women and minority-owned businesses in the United States. During these difficult economic times, the costs of doing business can sometimes become a tremendous burden for our entrepreneurs and small business owners, particularly for women and minority owners that continue to face unfair disadvantages.”)

⁸⁹ See Stephanie Strom, Andrew Brimmer, First Black Member on Fed Board, Dies at 86, *New York Times* (Oct. 12, 2012), available at <http://www.nytimes.com/2012/10/12/business/andrew-brimmer-first-black-on-fed-board-dies-at-86.html> (last visited Feb. 5, 2014).

⁹⁰ See, e.g., Andrew F. Brimmer, *The Economic Cost of Discrimination Against Black Americans*, in *Economic Perspectives on Affirmative Action*, Joint Center for Political and Economic Studies (Margaret C. Simms ed., 1995).

⁹¹ See *id.* at 12-13.

⁹² See *id.* at 11-12. “[F]or many years, the U.S. Postal Service employed thousands of black men with college degrees in mathematics, chemistry, and other sciences who could not find jobs in the private sector.... Even today, despite the lessening of restrictions because of equal opportunity laws and the spread of affirmative action practices in industry, many blacks are still concentrated in positions that do not make full use of their talents. If racial discrimination were to be eliminated, blacks could migrate more freely from low to high productivity occupations where their contribution to total production would be increased. The result would be a gain in the nation’s total output of goods and services.” *Id.* at 13.

programming, which ultimately benefits all consumers. The [EEO] program we adopt today therefore should promote not just diversity, but also true competition.⁹³

3. MBEs Can Contribute to Workforce Development Opportunities for Women and Other Minorities.

A more robust array of MBEs operating in this industry could deliver a range of new opportunities for the underemployed and unemployed. In the broadband era, much emphasis has been placed on the importance of entrepreneurship and global competitiveness in fostering our nation's growth.⁹⁴ The presence of more MBEs could boost competition and would benefit consumers, particularly those in traditionally underserved communities.⁹⁵ Entrepreneurs often serve niche markets.⁹⁶ Entry by entrepreneurs into niche markets allows these startups to address the service needs that are often left unmet by larger incumbent carriers. The absence of larger carriers in many unserved and underserved markets provides an opportunity for entry for entrepreneurs who could not otherwise afford to directly compete with incumbents that have established retail and distribution channels, large marketing and advertising budgets, and existing subscriber bases. In addition to benefiting diverse communities, MBEs also provide an avenue to boost diverse competition by recruiting, hiring, and developing minority and women employees.

⁹³ See *Review of the Commission's Broadcast and Cable Equal Employment Opportunity Rules and Policies, Second Report & Order and Third NPRM*, 17 FCC Rcd 24018 (2002) (Separate Statement of Commissioner Kevin J. Martin).

⁹⁴ See, e.g., Remarks of FCC Chairman, Julius Genachowski, U.S. Chamber of Commerce (Oct. 14, 2011), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-310395A1.pdf (last visited Feb. 5, 2014) (delivering remarks on how broadband innovation is enabling opportunities and increasing competitiveness).

⁹⁵ See, e.g., Reply Comments of MVNO Association, WT Docket No. 13-135 (July 15, 2013). See also Wireless Telecommunications Bureau Seeks Further Comment on the State of Mobile Wireless Competition and the Role of Minority and Women-Owned Business Enterprises and Extends Period for Reply Comments, Public Notice, 28 FCC Rcd 9125 (July 1, 2013) (The Commission seeks comment on whether "MWBEs provide services to consumers who might otherwise be overlooked by others in the marketplace").

⁹⁶ See, e.g., Larry Myler, *The Two-Step Method For Finding Your Entrepreneurial Niche*, Forbes (April 23, 2013), available at <http://www.forbes.com/sites/larrymyler/2013/04/23/the-two-step-method-for-finding-your-entrepreneurial-niche/> (last visited Feb. 5, 2014).

Because wireless has become the new broadcasting medium (with increasing news, information and entertainment content), MBE firms inject sorely needed competition into the burgeoning wireless markets by offering new and niche services.⁹⁷

VI. The Importance of Secondary Market Transactions to MBE Participation

While many MBEs have entered the wireless industry via the FCC's DE program, MBE growth into sizeable institutions will depend on their ability to access spectrum through the secondary market. Secondary market transactions are those in which an operator gains access to spectrum through private commercial transactions. While access to capital remains a major obstacle, some MBEs have been successful in raising large sums of capital to acquire spectrum on the secondary market, especially when the seller actively seeks DE or MBE participation.⁹⁸ MBEs can raise significant capital when regulatory

⁹⁷ See Applications of AT&T Inc., Cellco Partnership d/b/a Verizon Wireless, Grain Spectrum, LLC, and Grain Spectrum II, LLC For Consent to Assign and Lease AWS-1 and Lower 700 MHz Licenses, Memorandum Opinion and Order, 28 FCC Rcd 12878, 12905 ¶66 (Sept. 3, 2013). See also *Section 257 Triennial Report to Congress, Identifying and Eliminating Market Entry Barriers, For Entrepreneurs and Other, Small Businesses, Report*, 26 FCC Rcd 2909, 2912 ¶5 (2011) ("The Commission fully recognizes the role that small communications businesses play in a robust American economy. Our efforts ... evidence the Commission's commitment to identifying and reducing or eliminating barriers that would impede the growth of such a vital sector of the industry and the economy.")

⁹⁸ For example, in 1999, when seeking merger approval SBC and Ameritech spun off properties in overlapping wireless phone licensing markets to a group of sellers that included minority billionaire Chester Davenport who managed Georgetown Partners, a Bethesda, Maryland private investment firm. See Seth Schiesel, *Ameritech to Sell Half of Wireless Business to GTE*, New York Times (April 6, 1999), available at <http://www.nytimes.com/1999/04/06/business/ameritech-to-sell-half-of-wireless-business-to-gte.html?n=Top%2fReference%2fTimes%20Topics%2fSubjects%2fT%2fTelephones%20and%20Telecommunications> (last visited Feb. 5, 2014). Davenport's company contributed \$60 million towards the \$3.3 billion purchase price of the company that eventually acquired the properties once held by Ameritech. In the end, Davenport owned a 7% stake in the spinoff company.

Steven R. Bradley, an African American entrepreneur with paging, cellular and PCS wireless experience, organized an experienced management team and raised over \$900 million through a consortium of private equity firms, including JP Morgan Capital Corp., The Carlyle Group, Arlington Capital and several minority-owned private equity firms to acquire then-Bell Atlantic's divested PCS licenses in Chicago, Illinois, and in Cincinnati, Ohio. See Lynette Luna, *New wireless operator picks up Verizon's divested properties*, RCR Wireless (Aug. 21, 2000), available at <http://www.rcrwireless.com/article/20000821/sub/new-wireless-operator-picks-up-verizons-divested-properties/> (last visited Feb. 5, 2014) ("Luna RCR Article"); see also *Investor Group Agrees to Acquire Wireless Businesses From Affiliates Of Verizon Communications*, Civic Partners (Aug. 17, 2000), available at <http://www.civc.com/news/archive/2000/000817.html> (last visited Feb. 5, 2014).

barriers are few. In 2013, for example, wireless business pioneer, David Grain, completed the largest minority spectrum acquisition valued at \$287 million involving large incumbents Verizon Wireless and AT&T.⁹⁹

Dating as far back as 2003, the FCC broadened opportunities for secondary market transactions by permitting licensees to lease their licensed spectrum to third parties, in an effort to achieve “more efficient and dynamic use of the important spectrum resource to the ultimate benefit of consumers throughout the country.”¹⁰⁰ In fact, the FCC lauded its secondary markets initiatives as a major accomplishment in its Section 257 Triennial Report to Congress in 2003, stating that the changes helped “further the ability of licensees and entities that seek to gain access to spectrum, including entrepreneurs and small businesses, to enter into arrangements best suited [to] the parties’ respective needs and business models.”¹⁰¹

Unfortunately, the FCC undermined much of the flexibility provided to DEs in secondary market transactions when it adopted the *Attributable Material Relationship* and *Impermissible Relationship Rules*

Bradley was the principal in FirstCall Telephone and Integrated Communications Group. ICG was a successful winner of the PCS C and F Block auctions. At the time, the initial deal was the largest-ever minority equity investment in a telecom acquisition, “supported by well in excess of \$100 million in minority private equity and almost triple the previous percentage level of the minority investment made in GTE’s buy of Ameritech wireless properties last year.” Luna RCR Article. The FCC approved the transaction, however, the deal fell apart at the last minute due to an issue with Deutsche Bank Securities, Inc., the debt provider. See Jon Van, *Deadline looms to divest PrimeCo*, Chicago Tribune (June 20, 2001) available at http://articles.chicagotribune.com/2001-06-20/business/0106200246_1_primeco-pcs-verizon-communications-wireless-license (last visited Feb. 5, 2014). A new consortium, PrimeCo Acquisition LLC, also organized by Bradley, ultimately acquired the Chicago MTA license in 2001. The minority-owned private equity was approximately \$55 Million in a \$460 million transaction and included investments by Opportunity Capital Partners, Syndicated Communications, Fairview Capital Partners, and Green Leaf Ridge Company.

⁹⁹ In September 2012, the FCC granted the Grain Spectrum, LLC and Grain Spectrum II, LLC (collectively, Grain Spectrum) applications to assign and lease a number of Lower 700 MHz Band B Block and full advanced wireless services licenses from Verizon Wireless and AT&T. In making its decision, the FCC determined that the transaction would meet its Section 257 obligation to further its “goal of extending opportunities in the wireless market to small and minority-owned businesses.” *In re Applications of AT&T Inc., Cellco Partnership d/b/a Verizon Wireless, Grain Spectrum, LLC and Grain Spectrum II, LLC For Consent To Assign and Lease AWS-1 and Lower 700 MHz Licenses*, Order, 28 FCC Rcd 12878, 12905 ¶65 (September 3, 2013).

¹⁰⁰ *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets, Report and Order and Further Notice of Proposed Rulemaking*, 18 FCC Rcd 20604, 20607 ¶2 (2003) (“*Secondary Markets Report and Order*”).

¹⁰¹ *Section 257 Proceeding to Identify and Eliminate Market Entry Barriers for Small Business, Report*, 19 FCC Rcd 3034, 3081-82 ¶156 (2003) (emphasis added).

in 2006. Although the *Impermissible Relationship Rule* was vacated by the Third Circuit, the *Attributable Material Relationship Rule* was upheld and, as previously discussed, continues to handicap DEs in the development of viable business plans and relationships that are standard industry business practices and provides needed capital and revenue to DEs, while still serving the public.

Spectrum leasing arrangements are also a vital component of business models utilized by MBEs. These provide increased access to capital, which in turn helps firms become facilities-based competitors – a goal shared by the FCC.¹⁰² Ironically, under the FCC’s existing *Attributable Material Relationship* rule, MBEs are prohibited from entering into leasing arrangements for more than 25% of spectrum capacity with larger entities if they seek to establish or retain DE status. This is inconsistent with the FCC’s previous findings in its Secondary Markets proceeding that leasing by a designated entity of “*substantially all of the spectrum capacity of the licensee*” with an entity that the DE has a prior business relationship with would cause attribution likely leading to a loss of eligibility.¹⁰³ The existing restrictions in the DE Rules are puzzling given that the FCC itself has recognized that spectrum leasing agreements with other licensees “will help achieve another of our goals, namely ensuring that many small businesses have significant opportunities to provide spectrum based services . . . and [will] enable [DEs] . . . to access additional capital through leasing arrangements that can be used to build out their networks.”¹⁰⁴ In today’s wireless market, wholesaling has become an important business model given the dominance of larger incumbents in the retail market.

¹⁰² *Secondary Markets Report & Order* at 20607 ¶2 (“Facilitating the development of these secondary markets enhances and complements several of the Commission’s major policy initiatives and public interest objectives, including our efforts to encourage the development of broadband services for all Americans, promote increased facilities-based competition amongst service providers, enhance economic opportunities and access for the provision of communications services by designated entities, and enable development of additional and innovative services in rural areas.”)

¹⁰³ *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets, Second Report and Order, and Second Further Notice of Proposed Rulemaking*, 19 FCC Rcd 17503, 17541-42 ¶77 (2004) (emphasis added).

¹⁰⁴ *Secondary Markets Report & Order* at 20626 ¶45.

The secondary markets policy also helps the FCC meet its obligation to promote efficient spectrum use of a scarce commodity among a wide range of competitors, including MBEs. Promotion and extension of this initiative without discriminatory limitations on leasing and wholesaling by DEs is one of several steps the FCC can take to renew its dismantled DE program. Greater opportunities for DEs in secondary market transactions should also be encouraged attendant to mergers or acquisitions.¹⁰⁵ These major transactions should incorporate diverse partnerships and demonstrate genuine consideration of diversity and inclusion. To that end, such measures should be an imperative in 2014.

As activity peaks in the wireless industry, especially around mergers and acquisitions, the FCC should put its best effort forward to ensure that diversity and inclusion are more compelling factors in their determination of whether any transaction meets the public interest standard. Similar to other industry verticals, wireless mergers ultimately impact media diversity given that smartphones and other mobile technology deliver news, information and educational content. Media ownership within the burgeoning sectors of the media and telecommunications industries – radio, broadcast, cable and satellite, is still a pressing policy concern. In his tenure as a Senator, President Barack Obama was very supportive of bold FCC action to further diversity in the broadcasting industry, having declared at that time that:

[i]t is time to put together an independent panel . . . to issue a specific proposal for furthering the goal of diversity in media ownership. I object to the agency moving forward to allow greater consolidation in the media market without first fully understanding how that would limit opportunities for minority, small business, and women owned firms.¹⁰⁶

¹⁰⁵ There have been a large number of mergers and acquisitions in the telecommunications industry over the past two years, including Softbank/Sprint and T-Mobile/MetroPCS. See, e.g., Cecilia Kang, *FCC approves T-Mobile merger with MetroPCS*, Wash. Post (March 12, 2013) available at http://www.washingtonpost.com/business/technology/fcc-approves-t-mobile-merger-with-metro-pcs/2013/03/12/cbef2330-8b3b-11e2-9838-d62f083ba93f_print.html (last visited Feb. 5, 2014). There have been an even greater number of transactions involving the sale of major spectrum portfolios. As we move into 2014, several industry-shaping transactions are currently before the FCC, including Verizon Wireless' sale of A block licenses to T-Mobile and AT&T's proposed acquisitions of Aloha and Leap, respectively. See Public Knowledge, *AT&T Buying Leap Wireless Would Be a Bad Deal for Consumers, Competition, and Vulnerable Populations*, July 12, 2013; see also Andrea Chang, *AT&T to acquire Leap Wireless in a \$1.2-billion deal*, Los Angeles Times (July 12, 2013) available at <http://articles.latimes.com/2013/jul/12/business/la-fi-att-leap-20130713> (last visited Feb. 6, 2014).

¹⁰⁶ John Eggerton, *Obama Calls on Martin to Slow Down on Ownership Review*, Broadcasting & Cable (Oct. 22, 2001) available at <http://www.broadcastingcable.com/news/washington/obama-calls-martin-slow-down-ownership->

In fact, the President was then supportive of legislation that required the FCC to create an independent panel on increasing the representation of women and minorities in broadcast media ownership and to act on the panel's recommendations before voting on any changes to its broadcast and newspaper ownership rules.¹⁰⁷

Strategic partnerships between DEs and larger companies can be very effective in bringing wireless services to underserved and unserved communities, especially in an expedited manner, and the FCC has been supportive of such relationships in the past.¹⁰⁸ Such relationships are not *per se* detrimental to diversity or serve to undermine the DE program or auction process. Just because a DE may expand the service offerings of an incumbent communications provider does not mean that the DE has any less value, less integrity, less control, or is providing less service to the public. For example, African American family-owned Wilco Electronic Systems, Inc. is a cable provider that provides voice, 4G broadband, and cable video services to low income communities in Philadelphia, Pennsylvania.¹⁰⁹ Wilco offers 4G broadband service provided by Clear, a subsidiary of Sprint, in partnership with Mobile Citizen, a non-

review/54090 (last visited Feb. 5, 2014) (reporting on letter from Senator Barack Obama to FCC Chairman Kevin J. Martin).

¹⁰⁷ Then-Senator Barack Obama was a co-sponsor of S.2322, Media Ownership Act of 2007. Section 2 “Requires the FCC to establish an independent panel on increasing the representation of women and minorities in broadcast media ownership and to act on the panel's recommendations before voting on any changes to its broadcast and newspaper ownership rules [and] requires the FCC to provide the panel, before the panel makes any recommendation to the FCC: (1) a full census of the race and gender of individuals holding a controlling interest in broadcast stations; and (2) a study of the impact of media market concentration on the representation of women and minorities in the ownership of broadcast media.” S. 2332 CRS Summary, Bill Summary & Status, 110th Congress (2007-2008).

¹⁰⁸ See, e.g., *Fifth R&O*, *supra* note 4 at 5579 ¶111 n. 87 (relaxing certain ownership and attribution rules with respect to cellular operators' participation in PCS to foster investment in DE ventures) (citation omitted).

¹⁰⁹ Wilco is one of the few African-American owned cable and telecommunications companies in the country. See Wilco Electronic Systems, *About Wilco*, available at <http://wilcoinc.com/about.html> (last visited Feb. 19, 2014). It is also a partner in NTIA's BTOP Freedom Rings program in Philadelphia, a government, grassroots organization and private sector partnership whose objective is to bring broadband and computer skills to the millions of citizens that live in underserved or unserved poor urban communities.

profit that provides affordable internet through partnerships nationwide.¹¹⁰ Mobile Citizen is also a part of the Connect to Compete partnership.

Notwithstanding its partnership with Clear, Wilco makes independent decisions about hiring, the pricing of its services to meet the unique needs of its community, how best to deploy its services and resources, and what partners to engage with. In Wilco's case, they would be a potential spectrum bidder, but do not have the capital nor time to purchase spectrum at auction or on the secondary market and then build it out without a strategic partnership or a joint venture relationship. This paper does not suggest that all DEs desire or will need to enter into strategic partnerships with larger incumbents and firms, but those that do should not be penalized. Moreover, where possible, the FCC should stimulate these partnerships where it makes sense in the negotiation of industry mergers and acquisitions.

VII. Nine Policy Recommendations to Advance Minority Spectrum Ownership

It has been the inconsistency of the FCC's DE program, coupled with its impact on more promising opportunities like secondary market transactions that have impacted MBE engagement as licensees and spectrum-assets owners and managers. With the upcoming incentive spectrum auctions and the gradual release and bidding of existing and future inventories of advanced services spectrum, the FCC should reestablish an environment where incentives for MBE participation are encouraged and, where possible public interest conditions should be mandated.

This paper presents *nine* policy recommendations that can assist the FCC in facilitating measureable improvement in DE participation in upcoming auctions. Adopting these recommendations would go a long way toward eliminating the major market entry barriers that impede the ability of qualified new entrant DEs to raise *and* allocate capital in the most productive means possible and develop viable business plans that reflect common industry practices regarding the use of spectrum.

¹¹⁰ Wilco's 4G service is offered at \$14.95 per month, *a la carte* or bundled, and brings high-speed broadband to one of the lowest poverty areas in the city. It is only one of two providers offering affordable broadband to low income customers in its geographic area; the Comcast Internet Essentials program is the other alternative provider.

1. Eliminate the *Attributable Material Relationship Rule*.

DEs should be able to retain their DE status, including the value of bidding credits without having to attribute the revenues of other firms (large or small), despite entering into leasing, wholesaling, and/or resale arrangements for more than 25% of spectrum capacity to one entity. Wholesaling and leasing arrangements, in particular, are important vehicles for small and MBE new entrants to build capital and use that capital in the most efficient and productive means possible. It has become a standard and important industry practice given the dominance of national and regional carriers in the retail market.

Additionally, the FCC has recently clarified that it would review applications or proposed transactions that propose greater than 25% foreign ownership of broadcast stations on a case-by-case basis, stating that “a clear articulation of the Commissions approach to section 301(b)(4) in the broadcast context has the potential to spur new and increased opportunities for capitalization for broadcasters, and particularly for minority, female, small business entities, and new entrants.”¹¹¹ Significantly, this clarification will also help eliminate the disparity between foreign ownership of common carriers and that of broadcast stations.¹¹² How ironic that the FCC opens one door for increasing minority ownership in broadcasting – a door that has been virtually shut for 100 plus years – but it continues to keep a door to increased capital for wireless MBEs closed. It is very unfortunate that MBEs in the wireless industry may need to raise foreign capital instead of using readily available means of financing right here at home. It is time to level the regulatory playing field for DEs in leasing, reselling and wholesaling.

2. Increase bidding credits to at least 40%.

An increase would help compensate for the harms caused by the 2006 DE Rules and “counterbalance the tendency of auctions to concentrate license ownership in the hands of several very large companies.”¹¹³ This is a nominal increase from the maximum 35% bidding credit level used in forty-five (45) previous auctions of varying bands and services, and comparable to the 40% and 45% bidding credit levels used in two previous auctions.¹¹⁴

¹¹¹ Commission Policies and Procedures Under Section 310(b)(4) of the Communications Act, Foreign Investment in Broadcast Licenses, MB Docket No. 13-350, Declaratory Ruling (rel. Nov. 14, 2013) at ¶10.

¹¹² *Id.* at ¶6; *see also id.*, Separate Statement of Commissioner Ajit Pai (“This disparity does not make any sense to me, and it harms our nation’s broadcasting industry. . . . I am therefore pleased that today’s Declaratory Ruling takes a much needed step towards leveling the regulatory playing field.”)

¹¹³ *See Fifth R&O* at 5539 ¶15.

¹¹⁴ Auctions #14 (WCS), #16 (800 MHz SMR), #18 (220 MHz), #20 (VHS Public Coast), #21 (LMS), #23 (LMDS Reauction), #24 (220 MHz), #25 (Closed Broadcast), #26 (929-931 Paging), #27 (Broadcast), #28 (Broadcast), #30 (39 GHz), #32 (New AM Broadcast Stations), #34 (800 MHz SMR (General), #36 (800 MHz SMR), #37 (FM Broadcast), #39 (VHF Public Coast & Location and Monitoring Service), #40 (Paging), #42 (Multiple Address System Spectrum), #43 (Multi-Radio Service), #44 (Lower 700 MHz Band), #45 (Cellular RSA), #48 (Lower and Upper Paging Bands), #49 (Lower 700 MHz Band), #53 (MVDDS), #54 (Closed Broadcast), #57 (Automated Maritime Telecommunications System), #59 (Multiple Address Systems), #60 (Lower 700 MHz Band), #61 (Automated Maritime Telecommunications System), #62 (FM Broadcast), #63 (MVDDS), #64 (Full Power TV), #68 (FM Broadcast), #70 (FM Broadcast), #72 (220 MHz), #79 (FM Broadcast), #81 (LPTV), #82 (New Analog TV), #85 (LPTV & TV Translator Digital Companion Channels), #86 (Broadband Radio Service), #87 (Lower & Upper Paging Bands), #88 (Closed Broadcast), #90 (VHF Commercial TV), and #91 (FM Broadcast) had 35%

Further, the equity and debt markets have become far more challenging since 2006, and no other viable DE incentives are currently available to potential bidders (e.g., “closed” license auctions that have been so central to historical DE success).

3. Reinstitute select DE-only closed spectrum auctions.

Doing so would level the playing field for DEs against large incumbents and well-financed new market entrants.

4. Incorporate diversity and inclusion in the Commission’s public interest analysis of mergers and acquisitions (“M&As”) and secondary market spectrum transactions.

Such analysis would ensure that there are compelling factors in the determination of whether any transaction meets the public interest standard, including MBE and WBE participation. Such documentation should also be a part of the agency’s annual Wireless Competition Report to Congress.

5. Conduct ongoing recordkeeping of DE performance.

The Commission should also retain specific information about the MBE and WBE status of bidders, in addition to the small business status, to accurately measure auction outcomes.

6. Complete the *Adarand* Studies, updating the Section 257 studies released in 2000.¹¹⁵

These studies should specifically detail market failures as defined by Section 257, and should include a comprehensive review of the successes or failures of the DE program as well as race-neutral measures to implement Section 309(j) since its inception.

7. Regularize procedural requirements.

Such action would ensure that future regulatory and policy changes are conducted with ample time for public notice and comment, with outreach to all types of DEs to ascertain the real-world impact of such changes, and with sufficient lead time for DEs to make any necessary adjustments to financing and business plans.

8. Conduct a substantive review of proposed DE rules.

Such review should also include a review of potential market entry barriers and of significant economic impacts on DEs for auction rules at the NPRM stage of the rulemaking process in compliance with the Regulatory Flexibility Act, as amended.¹¹⁶

maximum bidding credits. Auction #3 (Regional Narrowband) and Auction #17 (LMDS), had maximum bidding credits at 40% and 45%, respectively. FCC auction archives and releases, http://wireless.fcc.gov/auctions/default.htm?job=auctions_home (last visited Feb. 1, 2014).

¹¹⁵ See *supra* note 18.

¹¹⁶ 5 U.S.C. §§601 *et seq.*; see also Rebecca Krafft, *President Obama Issues Executive Order To Improve Rule Review*, The Small Business Advocate, SBA Office of Advocacy, Vol. 30, No. 1, January – February 2011, reporting on Executive Order 13563, *Improving Regulation and Regulatory Review* (issued Jan. 18, 2011) (“The executive order directs federal agencies to enact procedures to review significant regulations on a regular basis in order to identify and revise those that have become ‘outmoded, insufficient, ineffective, or excessively burdensome.’”)

9. Support increased funding for & statutory amendments regarding the Telecommunications Development Fund.

Reinvigoration and reactivation of TDF can help support today's DEs, especially MBEs and WBEs, by providing financing consultation for auction participants, and support for and/or partnership with producing the FCC's *Adarand* studies required to meet constitutional strict scrutiny requirements. Section 714 of the 1996 Act also needs to be amended by Congress to relax its stringent debt requirements, and to permit TDF to earn interest not just from upfront auction deposits, but all auction payments to the U.S. Treasury.¹¹⁷

Recommendations #1, #2 and #4 - repealing the *Attributable Material Relationship Rule* and increasing DE bidding credits and incorporating diversity and inclusion in the Commission's public interest analysis of M&As and secondary market spectrum transactions - should be considered the highest priorities, to ensure that MBEs are not excluded from wholly participating in pending and future auctions. The FCC's action or inaction on these key recommendations will determine whether DEs can be fully engaged in upcoming auctions and secondary market transactions, plus whether MBEs can achieve the scale they'll need to become major competitors and innovators. These efforts would also help level the playing field to avoid a new form of 'ownership divide' in the wireless industry.¹¹⁸

Above all, the Commission should act expeditiously. If the FCC is ever to meet the historic goals of promoting MBEs and of ensuring the benefits of a diverse pool of wireless infrastructure owners or investors, it should assign the highest priority to DE program and secondary market reform. And irrespective of what changes the FCC should choose to adopt, the Commission should act with a sense of finality, since business certainty is necessary to foster robust investment and growth in the industry.

These recommendations, if implemented, would help the Commission reposition itself to comply with the statutory obligations set forth in Sections 257 and 309(j) of the Communications Act, as well as

¹¹⁷ See Trigg TDF Article at 203-05 (comparing the difference in TDF's ability to provide funding if it were not limited to interest earned on auction upfront deposits).

¹¹⁸ Leonard M. Baynes, *The Other Digital Divide: Disparity in the Auction of Wireless Telecommunications*, 52 Cath. U.L. Rev. 53 (2003) at 351 (comparing the disparity between people of color and whites to access to computers and the Internet as reported by the US. Department of Commerce in its annual survey, *Falling Through the Net*, with fewer opportunities on average for spectrum ownership by minority groups than non-minority groups, notwithstanding race-based bidding credits).

the Regulatory Flexibility Act, in addition to the FCC's expressed interest in promoting greater diversity and increased competition in wireless licenses ownership.

VIII. Conclusion

The FCC has a unique opportunity to promote the successful participation of MBEs in upcoming auctions and future private sector transactions consistent with the mandates of Congress and its own findings that meaningful participation by a diverse selection of service providers is in the public interest. To advance innovation and competition while fostering MBE participation in the wireless industry pursuant to its congressional mandate, the FCC should take all necessary steps to usher in changes or new policies that help, not hurt, MBE participation and success. Empowering these entities for success contributes economic opportunity to under-represented citizens and their communities, and ensures that the new digital economy is energized by the diversity of background, expertise and opportunity for all stakeholders.

Today, due to marketplace dynamics, long-standing market entry barriers and discriminatory practices, compounded by regulatory and legal impediments, MBE ownership of full power radio and TV stations is at its lowest in decades, and the number of MBE-owned cable systems is negligible, at best. Adopting the recommendations herein will help ensure that minority entrepreneurs in wireless spectrum ownership will thrive and maintain lasting institutions, to the great benefit of the nation.

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About the Minority Media and Telecommunications Council

The Minority Media and Telecommunications Council (MMTC) is a national nonprofit organization dedicated to promoting and preserving equal opportunity and civil rights in the mass media, telecommunications and broadband industries, and closing the digital divide. MMTC is generally recognized as the nation's leading advocate for minority advancement in communications. MMTC strongly believes that the breathtaking changes in communications technology and the new global forms of media partnerships must enhance diversity in the 21st century.